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A. W. Edmonds Feb^y. 1864

British Mineralogy
— or —
coloured figures.

intended to elucidate

The Mineralogy
— of —
Great Britain

By Martha Preby

From James Sowerby, F.L.S.

*Honorary member of the Physical Society of
Göttingen.*

*Designer of English Botany, author of
English Fungi, &c.*

VOL. II

M.S. 1840

James M. Smith

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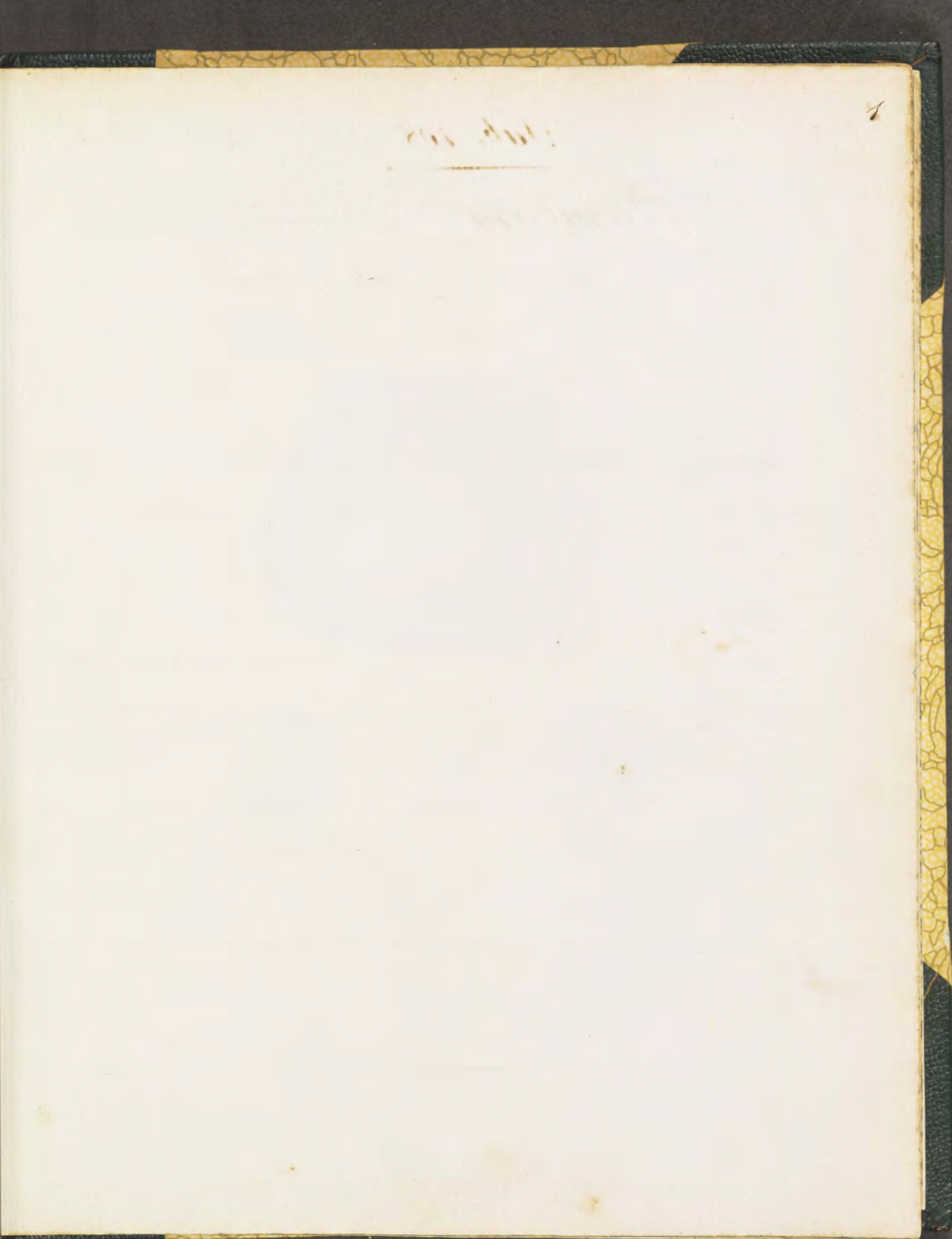
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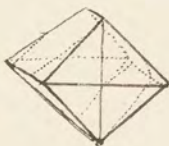
Robt. Sticht,
1903.





*Plumbum sulphatum.**Crystallized Sulphate of Lead.**Fig. 1. Crystallized.*

This is one of the 14 of modifications of Sulphate of Lead - which does not appear to have been noticed before, and shows a curious change as to the formation taking place by means of spirit. The inner part of the crystal one of the primitive octahedron, apparently touching to a new modification by decomposition, and forming spindles from the mutual bases of the two pyramids of the octahedron - This seems quite new to the mineralogical world. However Lavoisier has carbonate of Lead in dodecahedral crystals, looking as if decomposing, with spindles attached in a particular manner.



*Crystallized Sulphate of Lead, or Vitrified Lead Ore, in
Spicula on the surface of the Crystals.*

*Argilla hydrata.**Hydrargillite.*

Class 2. Earths.

Order 1. Homogeneous.

Gen. 1. Argil.

Spec. 2. Hydrargillite.

Div. 1. Crystallized.

Spec. Char. Argil in combination with water.

Syn. Hydrargillite. Davy in Phil. Trans.

Wavellite. Babington in Davy's paper Phil. Trans.

D^r Wavell first discovered this substance, near Barnstable. it was once called a Leolite, but more properly Hydrargillite (from *hydr* water, and *argillos* clay). "The most common appearance is in hemispherical groups of crystals" (on the surface of the gangue); "in some instances it exists as a collection of irregularly disposed prisms forming small veins in the stone; no insulated or distinct crystals have yet been found." (Sowerby's specimens terminate the radii outwardly, something like sulphate of Barytes, and seem to be parts of a depressed octahedron, sometimes a little truncated: see middle figures.) "Its colour is white in a few cases with a tinge of gray or green, and

in some pieces (apparently beginning to decompose) of yellow. Its lustre is silky, some nearly opaque, Its texture is loose." The upper fig: chiefly resembles this description. The lower fig: has small dark circles, which seem to be same substance with the margin darkest. Those larger spreading radii, which condense into white opaque circles with the help of smaller stellæ, terminate towards the ends. The whiter parts are small opaque clusters, in which the three darker ones are imbedded: A similar substance has been found near Tours, Corn: which has been examined by the Rev: W. Gregor of which I hope hereafter to give a figure.

Mr. Dancy's analysis of Hydrargillite.

Alumina	70
Silica	26.2
Lime	1.4
Loss	2.4

100.0

Upon further examination we find it possible that the crystal may be derived from the cube, as we find the fraction perpendicular to the terminal faces of the right hand figure on a plane with the lengthened sides; and another parallel to the plane of the terminal face. The scheme or prism is con-
sisting of these faces, forming 4 sides, and there are 2 triangular faces set edgewise ^{wise} on the broader angle. These faces were too small to be measured. These faces are often somewhat rounded with a rusty sort of decomposition.



Hydrongillite, or Wavellite. Bristol.

*Strontia sulphata.**Sulphate of Strontian.*

Class 2. Earths. Ord. 1. Homogeneous.

Gen. 6. Strontia. Spec. 2. Sulphate of.

Div. 1. crystallized.

Spec. Char. Strontian in combination with Sulphuric Acid.

Syn. Schwefel Saurer Strontianit. Emmerl. 3. 312.

Strontiane. Daubenton, tab. 19.

La Celestine. Brochant, 1. 640.

Strontiane sulfatée. Haüy, 2. 313.

Sulphate of Strontian was discovered by M^r. Sobin in 1794 at Midland, near Bristol. He observed that he discovered detached veins in different parts of the cliff. The strata in which the veins are found are nearly horizontal, consisting of Lime-stone of different hardness, and argillaceous Sandstone intermixed with Clay and Gypsum, and some of the fissures were filled up with sulphate of Strontian from 3 to 12 inches thick.

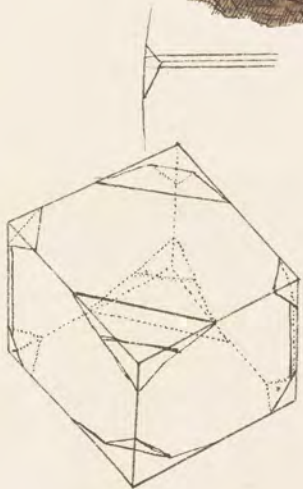
The primitive appears to be a rhomboidal prism of about $105^{\circ}, 275^{\circ}$. ours are a little truncated at the solid angles, otherwise they represent the primitive,

The fractures are parallel to the primitive faces, and those of the upper and lower faces are brightest, and often show a sort of spaline lustre. Some the two diagonal fractures may be seen. Cross fractures somewhat splintery, harder than carbonate of Lime, and softer than Sulphate of Barytes. The natural colour is a little milky and somewhat bluish, whence Werner calls it Celestine, nearly transparent. Spec. Grav. according to Clayfield from 3.88 to 3.96; the fibrous about 3.91. Analysis by him

Strontian	116.5
Acid	83.5
A Little Iron	

200

Sulphate of Strontian was in many cabinets before this discovery of Mr. Tobin's, as Sulphate of Lime, or Sulphate of Barytes, — among others in the Woodwardian Collection at Cambridge. It is found in Sicily, Mont-Martin near Paris, and in America. Those of Sicily are said to be the finest, and are columnar, not tabular like the Bristol ones.



Crystallized Sulphate of Strontian. Bristol.

Plumbum sulphureum; var. antimoniatum.

Antimoniated Galena or Sulphuret of Lead.

Clas. 3. Metals.

Ord. 1. Homogeneous.

Gen. 15. Lead.

Spec. 3. Sulphuret of Lead.

Div. 2. Imitative.

Var. Antimoniated.

Syn. *Plomb sulfuré antimonifère.* Haüy, 3. 462.

This is often found accompanying common Galena. It is commonly known to Mineralogists by the peculiar small shiated appearance which is attributed to the nature of the crystallization of the Antimony, and which seems to arrange the prisms of common Galena, so that one substance interrupts another may be recognized new; and perhaps in some other place we may be able to show something more important in the nature of the laws of mixed crystallization. This specimen seems to be less antimoniated towards the base, and somewhat resembles Tab. 110.

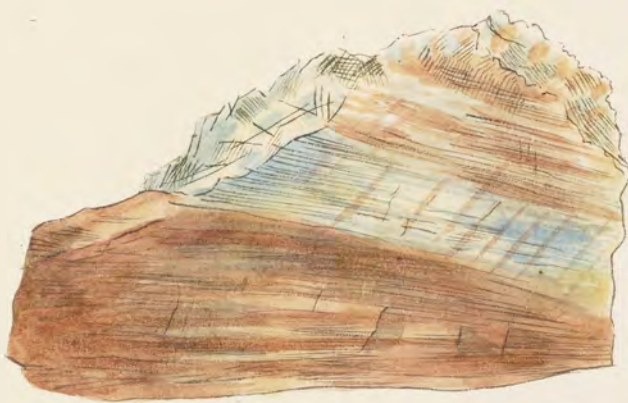


*Sulphuret of Lead containing a small
portion of Antimony.*

*Strontia sulphat.**Sulphate of Strontian.**Div. 2. Imitative.*

The upper figure is from Aust Passage, near Bristol, and its curved appearance renders it at first sight sufficiently curious, besides its partaking of the blue and red colours. The striated Strontian in the middle figure seems to answer to the Celestine, more generally than the last, as it is here coloured.

The fibres in this sort, which comes from Breslavia, are very straight, and somewhat laminated.



Striated Sulphate of Strontian & Celestine.

Tab. 143.

Strontia sulphata.

Sulphate of Strontian.

Div. 1. Crystallized.

The plated Strontian here figured is in a sort of
Sandy matrix. It is like that in Tab. . excepting
that the latter was in much larger pieces, without
matrix, & nearly white. The crystals are more con-
fused, yet are occasionally found very neatly de-
termined at two or three sides, as in this specimen.
The geometrical sketch at the bottom shows the be-
setting at the corner, between the primitive faces.

This kind is chiefly found at Redland near Bristol.



Plated Sulphate of Strontian. Bristol.

Plumbum sulphureum; var. haematiticum.

Haematitic Sulphuret of Lead, or Haematitic Galena.

Class 3. Metals.

Ord. 1. Homogeneous.

Gen. 15. Lead.

Spec. 3. Sulphuret of Lead.

Div. 2. Imitative.

Lowerth had heard that Galena was to be found in coal at Matlock. he had a piece sent him from thence which being full of decomposing Pyrites fell to pieces. This is not only rare for being among coal, but for being in this curious haematitic form, a form which has not yet been noticed in Galena, & which will help more perfectly to show the nature of substances that have a regular primitive crystal, passing into, or placing themselves in, a rounding figure.

The present specimen is radiating from a centre, forming circular and hemispherical segments, much resembling Haematitic Iron Ore — tab. 62. and .

This substance is evidently formed of cubes, and has assumed this particular shape from; certain circumstances; and settling from its solvent with perfect preservation

of its nuclei, which are very clear upon examination. although very minute they are distinct cubes: and as any form made up of perfect cubes with level sides would, in forming a radiating figure be loose in its texture, unless well closed with others in the interstices; so this, so closely formed in that particular, is very useful to us to determine other parts of the like nature. The left hand figure is of two nuclei — and the right hand figure shows the manner of its accumulation, and will be useful in analogy.



*Sulphuret of Lead, or Galena diverging from a
Centre in a hematitic form.*

Tab. 115

Arsenicum feruum.

Irony. Arsenic.

Class 3. Metals. Ord. 1. Homogeneous.

Gen. Arsenic. Spec. Combined wth Iron.

Dist. 1. Crystallized.

Spec. Char. Arsenic in combination with Iron.

Syn. The arsenical. Häuy, 4. 56.

Arsenic pyritous. Wispichel. Horn. 2. 197.

Native Arsenic alloyed with Iron. Wink. 2. 256.

This substance much resembles the whitish Iron Pyrites or arsenical Sulphuret of Iron, & seems to have been partly confounded with it by Kirwan; who observes, that "the Marcasite found near Dublin, called Irish Diamonds, is of this species." This latter is however to be most readily distinguished by the crystals being right-angled, { A small portion of arsenic may be found in them, but not sufficient to alter the crystal }

whereas the present is an acutely rhomboidal prism. It is perhaps not unnatural for Irish Pyrites to have a little arsenic, but not in sufficient quantity to characterize a species. The colour is different in the interior; one being a grayish white, the other yellowish. This specimen came from Cornwall; & is remarkable for having somewhat acicular crystals collected in diveriating bunches, which pervade Blende, Copper Pyrites, & Quartz. Before the blowpipe it melts easily, gives out copious white fumes strongly scented with Garlic, and highly noxious to the lungs: what remains is a small gray globule of magnetic Iron.

The right hand figure shows the primitive rhomboidal termination of an elongated crystal, with a decrement upon the obtuse solid angle. The face produced by this decrement gives for its incidence upon the rhomboidal face 149° or thereabouts: This modification seems to be new, as Haüy has not mentioned it.

The left hand figure represents another view of the primitive, with the decrement on the acute angle, which agrees with letter s of Haüy's fig. 137.



Arsenical Iron Ore.

Ferrum oxygenizatum.

Wood-like Iron Ore.

Class 3. Metals. Ord. 1. Homogeneous.
 Gen. 8. Iron. Spec. 3. Oxide of.
 Div. 2. Imitative. Var. Wood-like.

This Specimen came from Bristol. found in a ploughed field. It is of that variety often called Woodlike Iron Ore and much resembles Woodlike Iron Ore. It however is much lighter & softer, & much larger than Wood Iron has ever been found. Its weight is about 7th, & its diameter about 6 inches by 5 inches. The figures being smaller, the many centres from which the radii form give it a pretty variegated appearance, and the radii are relieved by the darker tints of the striae which are least obtrusive. The circles are so regular as to seem forced in the drawing. but it is not so. It may be curious to observe how reciprocal the force of formation is in this Specimen as each centre has terminated its radii with as little disturbance to its neighbour as possible. The primitive crystal of Oxide of Iron is not yet known; whatever it is it must have some affinity to the Galena -
 - tab. 114.



Wood-like Oxide of Iron. Bristol.

Plumbum sulphatum crystallinum?

Crystallized Sulphate of Lead.

Clas. 3. Metals

Ord. 4. Homogeneous.

Gen. 15. Lead.

Spec. 4. Sulphate of Lead.

Div. 1 Crystallized.

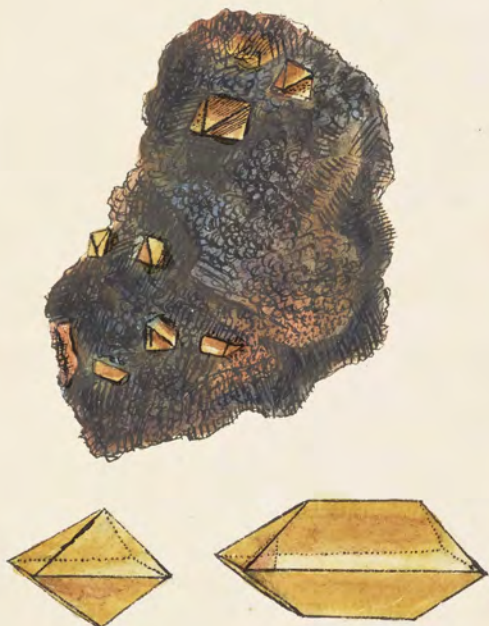
Var. 1. Primitive.

Syn. Plomb sulfate primitif P. Haüy, 3. 504.

Naturlicher blei vitriol. Emmerl. 3. 413.

Native Vitriol of Lead. Kirw., 2. 211.

Anglesea is the only place that produces this substance, it comes from the Parys mine. The present specimen is not so brilliant as many, but of the kind is one of the largest and best crystals yet procured. Its fracture in some directions is laminated parallel to the primitive, in others vitreous. Perhaps one of its characters may be taken from its odour, which is similar to the smell of the place in which white lead is prepared, with a peculiar pungency. It is easily reduced on Charcoal. — The forms are in general somewhat neat, & the crystals sometimes as clear as the finest glass; at other times they are coloured with an oxide of Iron, from a yellowish to a rusty brown. — They are brittle and soft enough to be scratched by sulphate of Barytes, but not carbonate of Lime, and are mostly found on an ochraceous gangue.



*Crystallized Sulphate of Lead, or Vitriolated Lead
Or. Anglesen.*

Tab. 118.

Ferrum oxygenizatum, var. crystallinum.

Crystallized Oxide of Iron.

Class 3. Metals.

Order 1. Homogeneous.

Gen. 7. Iron.

Spec. 3. Oxides of Iron.

Div. 1. Crystallized.

Gen. Char. Colour Gray. Harder than most other metals.

Attractible by the magnet. Spec. Grav. 7.2 - 7.84. Kins.

Capable of combination by collision. Res. Soluble in all

the acids; precipitable from its solutions, the precipitate being of a blue colour, by sulphate of potash.

Spec. Char. In combination with above 24 percent. of oxygen.

Sp. Specular Iron Ore. Kins. v. 2. 162.

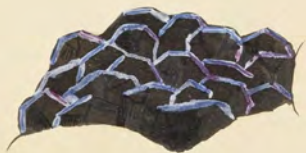
For Oligiste. Haüy, v. 4. 38.

The sort of iron ores from Lancashire, on which these crystals are sometimes found, is not uncommon.

There are also minute quartz crystals, frequently very transparent, attached to this ore, which on the dark ground deceive us with the idea of crystallized iron ore: however with the help of a lens the form of the crystals may be seen. The latter although a seeming

modification of carbonate of Lime, appear to be slightly magnetic. It is curious that this should so generally resemble, in the form of its crystal, the carbonate of lime, this being like a flattened equi-axe with various modifications. Romé de Lisle's, p. 48. 62. is the nearest resembling it, wanting only the 6 alternating narrow faces. The fracture is intermediate between glassy and splintery, & when fresh broken it shows an iron or steel-like lustre. The outside of the crystals are of a darker iron with much gloss or polish; the edges of some resemble blued steel, and sometimes reflect other colours. They stand edgewise on the matrix; which makes this hue more conspicuous, & adds much to the beauty of the specimen especially when magnified.

We presume this is the same as the beautiful iron ore from Elba, now first noticed in England.



Tabular Crystallized Iron Ore with iridescent Edges.

46

Carbo oxygenizatus.
Oxygenized Carbon.

Class 1. Combustibles. Order 1. Homogeneous.
Gen. 6. Carbon. Spec. 2. Oxygenized Carbon.

Gen. Char. Hardest of all known substances.

Spec. Char. Carbon combined with such a proportion of Oxygen as to remain in a solid state, mostly opaque black.

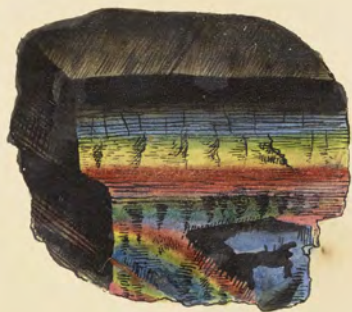
Syn. Native Mineral Carbon. Riv. 2. 49. { When Riv. wrote

This, common charcoal was thought to be pure carbon; it is since found to be an Oxide of carbon, and that Diamond is the only native mineral carbon known. Mr. Berthollet's description agrees with oxide of carbon, for which we quote him. }

Riv. 2. description of Native mineral Carbon, { see above } Blende-
Shale of Werner. { Jamieson calls this Shale Blende, & observes
that it does not stain the fingers } so well agrees with the
Denbigh coal, that in general his expressions may be made
use of. The specimen, he observes is the purest known and
came from Flanders. There is little doubt of the

Denbigh coal being nearly as pure an oxide of carbon as is likely to be found. "Its colour is black; its lustre from 3 to 4, approaching the metallic. Transparency 0. Hardness 4 to 5: brittle: stains the fingers." It could only be the softer part occasionally that stained the fingers: as in that from Swansea, resembling charred wood; dusty and with less lustre, than above described.

Denbigh coal is seldom stratified, and is apt to separate with a ready fracture or impulsion, in irregular strata. The cross fracture is often conchoidal & undulating. This fracture & the prismatic lines for which this coal is famous, give it the appellation of Peacock coal; a piece of which may be repeatedly heated red hot & on cooling the colours return. All coals commonly so called produce a black powder.



Dembigh Coal.

Carbo oxygenizatus.

Oxygenized Carbon.

The Swansea & Denbigh coals are nearly allied.

This Upper figure has the Charcoaly & Strakfid part in various directions. Some parts resemble burnt straw in regular rows: others form conical appearances, converging or diverging from a centre. Some in horizontal & oblique strata. The shining part has a shattered & confused appearance. Some of the Strakfid parts were slightly covered with charcoal in fine dust, easily rubbed off. In other parts were thick layers of charcoal in irregular strata, but somewhat horizontal to the other parts. all looking confused. very brittle and easily shattered to pieces. The lower piece is much tougher, and the strata have not a vestige of charcoal about them, nor will they stain the fingers. They are difficult to ignite, & burn without flame, remaining a long, and giving great heat, without much apparent change: whence they have been called Stone coal. They are used for smelting, & burning lime, & often mixed with such coals as easily flame, to assist in burning. They are supposed to contain less oxygen with the carbon than other coals so require the assistance of those which contain more.

Diamonds require oxygen to assist their burning, in the proportion of 4 parts to 5 in a strong heat; & in burning they pass into the Solid State of Charcoal, continuing to burn the while, and giving out carbonic acid gas (see description, Tab. 83.) It is found native in some caverns, wells and mines, & is called choke damp of the miners. It is often fatal to them) in the same way, the carbon being aerated by the caloric or matter of heat. Although Diamond has always been of high value, and well known from the earliest ages, yet it was left for M^r. Tennant in the year 1796 to prove it to be a pure carbon. see Phil. Trans. 1797. p. 123. There are other sorts of coals about Swansea mentioned in another part of this work. (Coal mostly appear to be the combustible remains of vegetation. They are mostly formed in the Striae of plains, composed of marl, sandstones, & limestones, most of which show the remains of animal or vegetable petrifications, or imprints. See Sand-Stones Tab. 71. The blackened parts in those figures are apparently the remains of bituminous carbon, as it were in the last stage of infiltration.



Swansea Coal.

56

Bitumen Gagas.

Jet.

Class 1. Inflammables. Ord. 2. Mixed.

Gen. 2. Bitumen. Spec. 1. Bitumen with oxygenized carbon.

Spec. Char. Bitumen combined with about 30 per cent. of oxygenized carbon.

Syn. Jet. Kirs. 2. 64.

Jais. Daubenton 30. De Born. 2. 79.

Variété du Schlackiges erdpack. Mineral. 2. 30.

Jayet. Haüy 3. 324.

Bitumen Gagas. Linn. Syst. Nat. ed. 13. 1. 3. p. 111.

The upper figure represents a curious piece of jet, remarkable for the remains & impressions of shells about it; it came from Lowestoft where amber & various pebbles are found. We shall consider jet to have passed from the remains of some sort of wood, as the ligneous fibres as in some instances seen; in other specimens it is so condensed and compact as not to be discernible. This substance appears also to be saturated with bitumen, so that it readily inflames, losing about 14 grains in 20, with much smoke and a slight bituminous colour. The remaininginder, if continued to burn

Leaves a very hoisting residuum. Spague black. powder always brown. takes a fine polish. The surface when rubbed is electric, which distinguishes it from cannel coal. It may be scratched by common calcareous spar, & will itself scratch amber and gypsum. The fracture is conchoidal, occasionally retaining that of wood. Lustre 3 to 4: from shining c. Sp. Gr. 1.104 to 1.744. Hard. It has generally been said to swim on water. Thin pieces, indeed, laid lightly on the water will float for a short space. Linn. called it Bitumen Gagaz, from the river Gagaz in Siqua near which it is found. The presence of shells and the impression of the form - Ammonis, indicate its former life under - ruled state. The lower piece has some signs of mineral strata having been on the upper surface, in an ob- solute impression, and also some obscured crystals of carbo- nate of lime underneath. The fracture is in part largely conchoidal. we may observe the woody stratification. Lowerly has a piece where the woody texture is evident, with small cubic pyrites on one side. With heat & water he decomposed a bit of it so as to expose its woody structure. It comes very near to the most indurated Bevy coal & Surtstrand (These also produce brown powder) evidently belonging to that division.



1-51

Jet, with an impression of a *Corvus Armonius*.

60

Tab. 122.

Calc sulphata.

Crystallized Sulphate of Lime, or Gypsum.

Class 2. Earths. Ord. 1. Homogeneous.

Gen. 3. Lime. Spec. 6. Sulphate of Lime.

Spec. Char. Lime combined with sulphuric acid.

Syn. Broad foliated Gypsum. *Wood. v. 1. 123.*

Gips et Stravensis. Emment. v. 1. 327. 540.

Chaux sulfate trapezienne. C. E. P. Haüy, v. 2. 207.

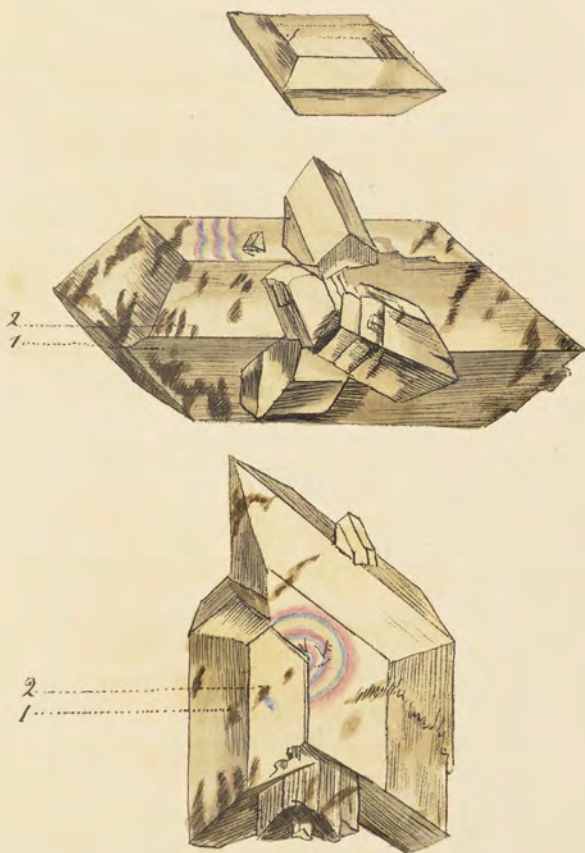
Natrum selenites. Linn. Syst. Nat. v. 3. 91.

Shotover Hill, Oxfordshire, seems to afford the clearest and
cleanest specimens of crystallized gypsum in the great-
est variety. They are mostly found in a clayey gan-
gue. The upper figure is what Haüy calls trapezien-
ne. Although this would be extending the lateral faces,
which might be easily done by putting plates on the
summit, each smaller than the last, form an octai-
dron: yet of a great many varieties we have not ob-
served this modification. The middle figure is a com-
mon variety from the same place, heightening towards
an octaidron but seldom extending farther than this figure.

They often have their angles a little irregular, so as not to meet: see the left hand corner near figures 1 and 2, also having other crystals sticking in them in different directions. If the laminae are opened in the manner of a flaw or crack, when not too wide, they admit the prismatic rays: see the upper face of middle figure and middle face of lower figure. They are said by most to admit of double refraction. Fig. 1. is a darkish spot of clay or soil naturally in the subject, and fig. 2. is the same seen a little duller through the other face at the same time; but this is common to all transparent substances. It is somewhat curious that the clayey stripes or spots have a peculiar direction diagonally to the acute angles. Spec. Grav. $2.2642 - 2.3117$. Hard. 2. Hairy. They are laminated, the laminae somewhat flexible; easily separated.

Hardness — Yields to the finger nail.

The bottom figure shows three crystals mixed together, and forming what is commonly called a matle.



1-67

Crystallized Sulphate of Lime or Gypsum.

64.

Shontia carbonata.

Carbonate of Shontia.

Class 2. Earths. Order 1. Homogeneous.

Gen. 5 Shontia. Spec. 1. Carbonate.

Dio. 1. Crystallized.

Gen. Char. Soluble in 200 parts of water at a temperature of 60°. Separates from a saturated solution in nitric acid, in the form of rhomboidal crystals. Promotes the fusibility of most other earths. Most of its salts tinge flame red.

Spec. Char. Combined with carbonic acid.

Syn. Shontian earth combined with fixed air. Wink.
v. 1. 332.

Shontian carbonate. Haüy, v. 2. 327.

This curious mineral was found at Shontian in Scotland in a lead mine which is now given up. We do not know that it has been found any where else. Its crystals are confusedly grouped, more or less diverging from a centre. They are sometimes of a 6-sided prism, vide Haüy. This came from Norwich. It has 6-sided prisms terminated at one end with 3 faces, resembling those of carbonate of lime,

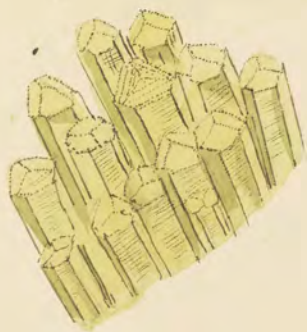
with the obtuse equiax termination. We have a specimen of with 6-sided bars, quite sliced, crossing a hollow. 3 faces of the prism are generally broader than the other 3, showing faint longitudinal striae & fractures parallel to them; but most readily to the 3 broader faces with transverse striae, which continue to the apex of the pyramid, & occasionally form an equilateral triangle. The pyramid may be divided in a direction contrary to its faces; therefore the nucleus is a dodecahedron with rhomboidal faces.

They vary in colour from a brightish watery green to a palish brown. It differs from carbonate of barytes (with which it was once confounded), by its weight, as well as by dissolving quickly, & with great effervescence, in nitric acid, without leaving a precipitate: & it is curious that a bit of Paper or a wick of a candle, dipped in this solution, after being dried, causes the flame to burn beautifully red; or the substance itself in fusion by the blowpipe will do the same thing. Spec. Grav. from 3.4 — 3.675. Hardness 5, Kinn. scratches carbonate of Lime, & is scratched by fluate of Lime.

Analysis by Pelletier:

Strontian	- - - 62.
Carbonic Acid	- - 30.
Water	- - - - 8.
	<u>100.</u>

- It is accompanied by carbonate of Lime, Sulphuret of barytes, Sulphuret of lead, & harmotome of Flints, or Harcolite of Kirwan.



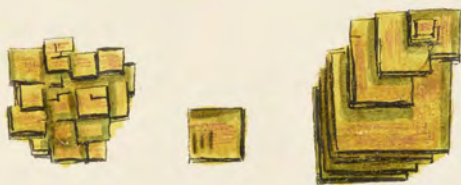
1-65

Crystallized Carbonate of Strontia.

68

Tab. 124

This variety is of a yellowish hue and appears to be splitting and decomposing, as it seems to decay at the edges, becoming rounded as if worn by oxygenic-ment. The gangue is chiefly a black oxide of copper. Its Spec. Grav. is 3.1212.



Yellow Oxide of Uranite crystallized.



Silex magnesiatus; var. *amianthiformis*.

Amianthus.

Class 2. Earths.

Order 1. Homogeneous.

Gen. 4. *Silex*.

Spec. *Magnesiatus*.

Div. 2. Imitative.

Spec. Char. *Silex* in combination with Magnesia.

Syn. *Amianth*. *Hind*. v. 1. 161. *Emmerd*. 1. 402.

Jameson, 1. 442. *Wern*.

Asbestos murens, *Amianthus*. *Waller*, 1. 408.

400.

Asbeste. *Hairy* 3. 245.

Amianthus is probably a decomposition, or change performed perhaps by some yet unknown chemical agent, as its situation in solid rocks seem to crumble. This unknown chemical agent does not appear to be common, as the *Amianthus* is not an universal substance in the silty filamentous form. This came from Portsey. This is partly what is called Mountain Cork in a rather dense state, including some very fine transparent carbonate of lime, in which there are extremely slender filaments of *Amianthus*, seemingly passing through it, and in some parts so incorporated ^{with} it, that it is

not to be discerned when they end or where the carbonate of Lime begins. The filaments run perpendicularly to the more dense or cork-like surface of the upper & lower sides of the specimen, which however has more of a cottony texture, but that is much finer than any cotton or vegetable thread: the first seems infinitely fine; the latter may be seen by a microscope to show a finally confirmed hollow filament. { I was highly pleased to find in Mr. Carlisle's Groomian lecture read to the Royal Society, Nov. 8. 1804, that he had determined the final filament in muscular flesh. I had been much puzzled with the assertion that Lovenhook had found them infinitely divisible: having long since taken the pains to examine a piece of Mutton flesh, I found the smallest filaments easily discernible, and agreeing with Mr. Carlisle's accurate account, as far as I examined, but they are not so in ~~Selachian~~^{the} or any filamentous earth. } It generally is found in Serpentine rocks.



Thready, Woolly, and Paper-like Asbestos.

This forms an appearance not unlike Moler, with the green
 Moler among it. When it has a more perfect appearance of
 moister without the green, it is considered as good manure,
 and provincially called Gault. It is often found about a foot from
 the surface. This is generally used to make the best white
 bricks of in Cambridgeshire. That with granular tale or
 Moler is of a dull hue, & found deeper. The same substance
 somewhat more compact is called Moler Stone: see tab.
 The petrifications in this stone appear mostly dark brown
 with ragged lumps of various sizes of nearly the same
 substance, somewhat similar to the Swampy Iron Ore of
 Thins, p. 2. 183. The petrifications are retained like it,
 sometimes nearly approaching that of Pyrites. These petri-
 fications are the round one on the left hand, supposed a
 hinder tooth of some fish; the right hand is considered
 as a fishes bone palate; the middle upper figure is a
 bivalve shell, the upper valve remaining in the state of
 carbonate of Lime, the lower one browned with the ore. It
 is a kind of *Ammonia* called *Gryphite*, very frequent among
 petrifications, on the left ~~after~~ under that, is part of a Coral,
 near which is a fishes palate, such as often extends to the
 form of Lupin pod. The left hand figure is part of
 a *Conus Ammonis*. The rude lump of the brown one on the
 right, with the adhering shells, like those of the *Ammonia Ignea*.
 -mela, found ~~likewise~~ on Crabs &c. has the impression of a small *Gryphite*.



Chlorite with Sand, &c. Cambridge.

Tab. 42^y.

Calc carbonata.

Fasciculated Carbonate of Lime.

Div. 1. Crystallized.

These crystals of Carbonate of Lime are rather rare. The representation of a regular crystal so neatly formed by a bundle of spicules is truly curious: and it is generally found that they have an ochraceous or brown tint with an opaque glaucous appearance, prettily contrasted with the brilliancy of the Quartz on which they lie. This is one sort and one of the rarest of the numerous productions of Derbyshire, and is found at a considerable depth in the ground.



Fusculated Carbonate of Lime on Quartz.

Tab. 128.

Silex Mica.

Mica.

Gen. 4. Silex

Syns. Mica, or Muscovy Talc. Kirw, v. 1. 210.

Mica. Hall, v. 3. 208.

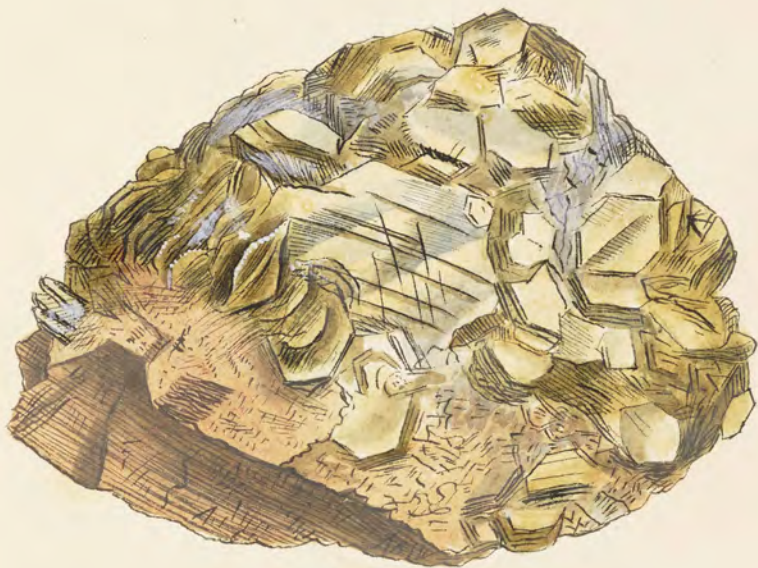
Mica membranacea. M. lamellosa, &c. Linn.

ed. 13. t. 3. 28.

Glimmer of the Germans.

Mica, μικρός, or μικρός, has been long noticed as a glittering substance, and often serves to countenance the idea, that our streets are paved with gold, & silver. It is one of the first things that catches the attention when fragments of the granite stones from Aberdeen, are lying in our streets for paving, or building, which has been frequent since the improvement of forming such durable stones into shape for that purpose; an improvement not much above half a century old. It has been confounded with Talc. See Tab, 150. . . The present specimen has most of the characters belonging to this very curious substance; It has signs of the integrant molecule, a ~~tet~~ trihedral prism

whose base is equilateral, and of the rhomboidal prism formed of two of these its primitive with various lengthened rhomboid, hexagons, &c.: see figures. It sometimes has the laminae bent. Its lustre is of the changeable kind; the upper plates showing the accumulated refracted silvery opacity between those beneath, each plate being transparent if separated. { Its fine lustre we cannot imitate without hazard of the colour changing; we therefore must request our friends to consider the shining parts of the plate as of a fine silvery or pearly lustre. } It is flexible and elastic; the plate when bent, will return to their places with a considerable spring; see bottom figure, a plate bent thus much will return - The straight line seen through shows its transparency; this elasticity, and its being destitute of ductility, distinguishes it from Tale, as hitherto the varieties of one species have been placed among those of the other by several mineralogists. Muscovy Tale of the older authors is undoubtedly mica, so named in contradiction to Venetian Tale; which, although nearly allied, is yet a distinct species, and may be looked on as a good sample of Tale.

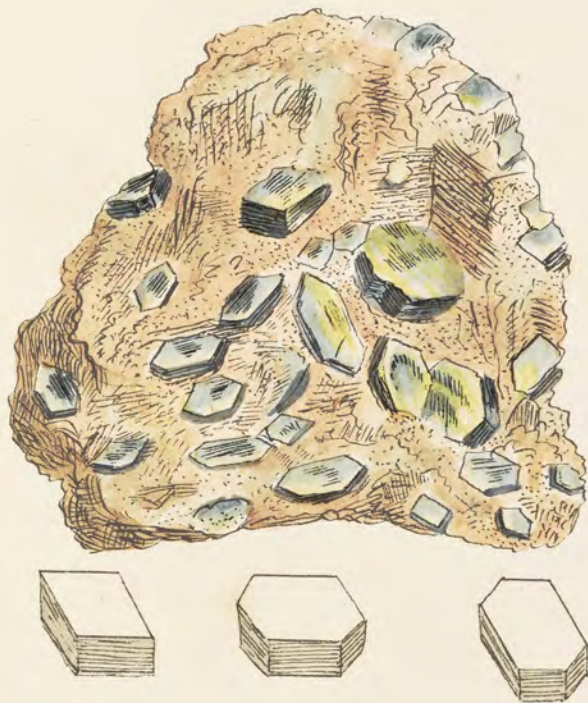


Mica in Plates, &c.

This Specimen differs very little from the Mica from this
 country, which is occasionally found seven feet in diameter.
 Scotland & Cornwall, produce it three or 4 inches square,
 or even larger. This kind of Mica is used for Lanterns &c.
 and is very convenient for Ships, as it bears the explosion
 of cannon without cracking. It is however liable to get
 scratched, and becomes rather opaque by heat, which
 opacity is not removed by water. This substance is spoken
 of as introduced into Rome in the time of Seneca to
 admit light into their apartments; but Agricola consider-
 ed what was then used as a plastered-stone. It seems to
 have been used in Agricola's time to shelter plants; in
 which case it would be much exposed to weather. Sulphate
 of Lime, tab. 122, saying that although it was not affected
 by the heat of summer or cold of winter, yet not wasted
 it considerably. Sulphate of Lime is found in France
 in crystallized masses sufficiently large to form, when
 split & cut, squares of many inches diameter. The name
 Sale has been applied to any laminated substance.
 Mica analysed by Vauquelin was found to contain:

Silica	50.0
Argilla	35.0
Oxide of Iron	7.0
Magnesia	1.35
Lime	1.33

Loss	94.68
	5.32
	<hr/> 100.00 <hr/>



Mica somewhat columnar, &c.

Silix magnesiatus; var. *amianthiformis*.

Leather-like Amianthus.

Div. 2. Imitation.

This bears a strong resemblance to the Oak Leather or *Dylostroma Gigantum* of English Fungi. tab. 358. so as hardly to be known by outward appearance, unless with a microscope; when we find the one formed of exceeding fine of exceeding fine filaments, & the other of hollow filaments. They are both flexible like leather, and to the touch equally soft. In cutting they require much the same force and sharpness of the instrument; they also bear nearly alike, with a shaggy filamentous appearance. One very sure test remains, that the one being heated red hot does not apparently undergo any change, but recovers its former appearance when taken from the fire; while the other burns away like Souchard or a fusce, or like the Spunk prepared from *Bot. ignarius*, E.F. 152, or *Tragus Sinder*.



Mountain Leather.

98

Uranium oxygenizatum.

Oxide of Uranic

Class 3. Metals. Order 1. Homogeneous.

Gen. 3. Uranium. Spec. 1. Oxygenizatum.

Div. 1. Crystallized.

Gen. Char. Dark brownish gray, dull, soft, brittle,
Spec. Grav. 6.144. difficultly fusible. Soluble
in nitric acid.

Spec. Char. Combined with a large portion of oxygen.

Syn. Uranitic ochre. Kirw. 2. 303.

Green Uranura. Emmert. 2. 584.

Uran oxide. Haüy, 4. 283.

Uran mica. Jameson.

Uran glimmer. Werner.

Cornwall has produced this substance but very sparingly. It is mostly imported from Bohemia, Saxa in the Harz, and Saxony, on a gangue composed of Pechblende in a decomposing state, and was first discovered by Klaproth in 1789. It has been confounded by many with Murate of Copper, & with Green Mica. Ours was labelled as Murate of Copper from Cornwall, and it appears not to have been well known when

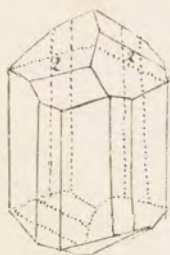
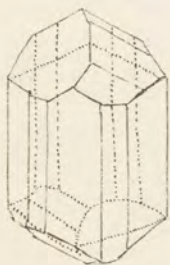
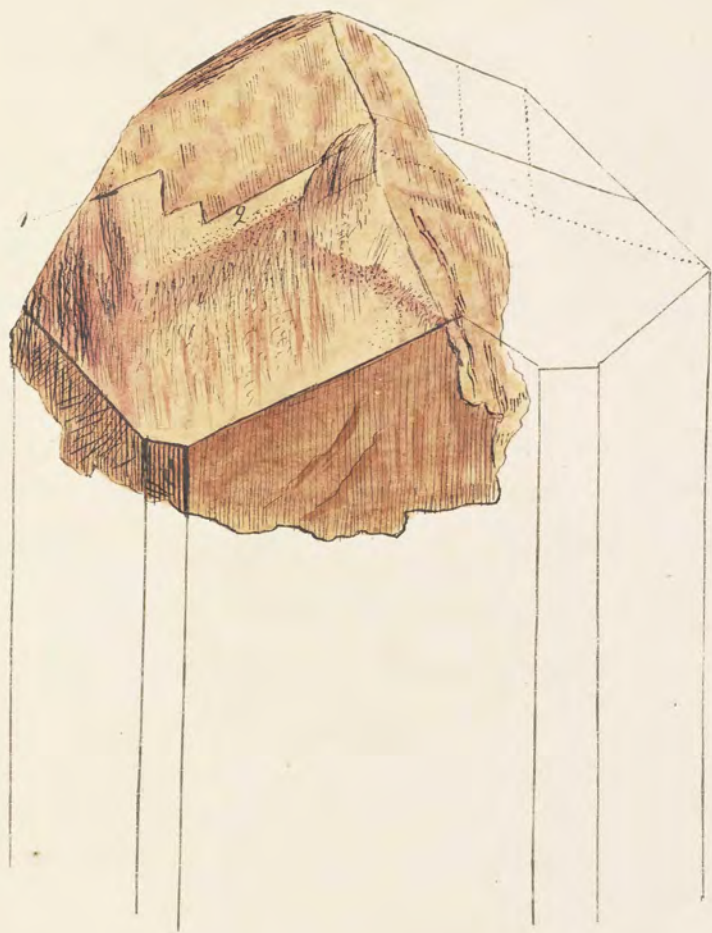
Mr. Washleigh published his first part of *Specimens of British Minerals, &c.*, for it was then called "Thin 4-sided Crystals of bright green Copper Ore from Lantharrack." Mr. Hinman informs us of its being first taken for Green Mica & by Werner, and afterwards for Calcobite.

The matrix of this specimen is Quartz, Arseniate of Copper, &c. Under the blowpipe it melts, becoming black.



Green Oxide of Uranite crystallized.

Perhaps one of the most curious circumstances which happens in this substance, is that of its crystals snaking, which here they do, according to the literal sense of that word, as distinguished from the hemitrope. { A crystal one half of which is turned upon the other. — Haüy } This came from Aberdeen. It is part of a large crystal, which includes some Quartz & a few specks of Mica, appearing at first a rude mis-shapen position to which I have added the outline for explanation. The crystal is formed of two similar halves of different crystals, locked as it were into each other; — see the *Lignage* line No. 1. The lower left hand figure represents a single crystal, in which the same faces are seen as are mentioned in tab. 21^e; the largest terminal face being the primitive one; but the small faces are greatly increased in size. If this crystal were divided in the middle in the direction of the dotted line, & one half turned round, it would not be in the least changed in form, answering to Haüy's remark, 3.612. The right hand figure is formed of 2 halves taken from the similar sides of 2 different crystals (or, which is exactly the same thing, of two pieces cast in the same mould) each exactly corresponding with one half of the left hand figure. In this the primitive face is divided into two parts, and each part is brought to correspond with part of a secondary face fig. 2,



Macleed Crystals of Feldspar.

106

*Silex Quartzum.**Flints*

Class 2. Earths. Order 1. Homogeneous.

Gen. 4. Silex. Spec. 1. Quartz.

Div. 2. Imitatives.

This coralloid flint was found at the bottom of the Chalk cliff on the eastern side, at Rottenclan Sussex. It is generally the nature of flints to be formed in some shape expressive of its having been in a state of solution, for although it is in a sort of stalactitic form, running like a gelatinous substance, yet it is always in a hard state, and looks as if it were almost recent, although it may have been many ages in the same state. Sowerby has a piece of coral from Bristol, which has flint & some calcareous matter passing into its interstices. The figure No. 1 is from Sussex. No. 2 sent him by Col^l Walsford. No. 3 came from the Isle of Dogs. No. 4 shows the inside of the same, No. 5 picked up in a gravel

put at *Stunnington*.

Some have considered these as parts of Mushrooms, such as *Phaeas*, &c petrified, some like marrow bones. others taken for a petrified *Agaricus*, showing, as it were, the impressions of the edges of the Lamellae, 3 or 4 inches in diameter and 8 or nine in circumference.



Imitative Mint Pebbles.

///

*Silex Salcum.**Sile.**Div. 2. Imitation, in grains.*

When it is found in a state as if it had suffered a change after peering with the original rock and with the remains of other subjects and animal exuvia, it assumes a new appearance. Thus it is found heaped in abundance in strata that seem to have originated from the fragments of rocks, as in the sandy matrix called there green sand of many parts of Somersetshire, &c. The upper specimen came from Bournemouth. The shell is formed of Lime, and the sand has some fragments of Lime amongst it, probably composed of broken shells &c., while the Chert is interspersed forming dark green specks. The shell is curiously divided by 5 large ridges, between each of which are 3 smaller ones. Sowerby found some sand nearly of the same nature at Chastton in Kent. curiously mottled or stratified with Chert: see the under figure; Woodward mentions greenish sand from Woolwich, p. 11. Dr Clarke & Mr Warburton have given Sowerby some sandy Lime from Castle Hill near Cambridge, where it is very abundant, & contains many Retifactions.



Chlorite Sand, Wiltshire and Charlton.

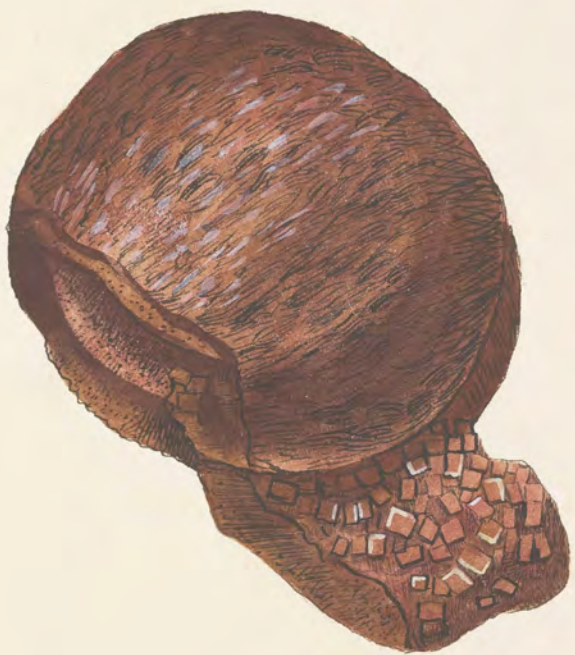
114

116

Ferrum oxygenizatum.Oxide of Iron.Div. 2. Imitative.

This Specimen, although generally speaking it might be called an Hematitic Iron Ore, having most of the characters belonging to it differs from that Substance in not being striated & in having none of an earthy fracture; it may however be placed near the Hematites. Whether it is a cast or change after crystallization may be difficult to determine. The lump at first looks like a globular Sulphate of Pyrites (see tab 160.) with the platy or tabular crystals standing edgewise, but these are probably derived from the decomposition of Pyrites; they are however each of them so much blistered or covered with bubbles (see the right hand side of the lower figure, tab. . a formation common to many Hematites) that they cannot be made out. The Hollow is lined very thin-edged, probably tabular, crystals, belonging to those of tab. . These are covered with a dark red or somewhat crimson powdery glimmer, sparkling like that of tab 163. and . .

The Halls, or lower part seems to have been cubical Iron Pyrites: see tab. . and. . which are externally covered with bubbles. Possibly the whole once formed a Sulphuret of Iron or Pyrites, and having lost the the Sulphur has become a mere oxide of Iron. Such fortuitous circumstances as this was formed by, sometimes give the shapes of pears, apples, lemons, &c. which are as highly valued as if true petrifications, and are very often difficult to be accounted for, especially by those who have not seen a series of specimens. This specimen was found about the year 1799 near Staunton, about 5 miles from Ploverstone. Lancashire, where smaller balls have been found with the appearance of the inner part of this, which has been called velvet, downy, &c.



Red Oxide of Iron. Lancashire.

120

Dr. Buchanan, whose researches in the East Indies are well known, brought some of the Breccia Rock, from Callender in Scotland, in which were found pebbles of Feldspar. As Feldspar of this description has not been mentioned before, Sowerby was gratified in having the power to show it here, where he has added some other amorphous Feldspar, known by the name of Pethense in Scotland, found in various parts of the Pentland Hills S.W. of Edinburgh. This is of some esteem in manufactories of porcelain, being a fusible composition of Silica & Alumina, but varying in the proportion or quality. It often disappoints the workmen that gather it, as well as the manufacturers, and Quarr nearly none has been sent to them as Pethense, especially for the white or gray sort, which has least Iron, and would consequently be of most value for their purposes.



Petuntse.

124

*Argilla electrica.**Tourmaline, or Schorl.*

Class 2. Earths. Order 5. Homogeneous.
 Gen. 4. Argilla. Spec. electrical.

Syn. *Tourmaline*. Kius. 1. 271.
L. Schorl. Brook. 1. 226.
Schwarzer Schorl. Emmel. 1. 95.
Tourmaline. Haüy, 3. 31.
Borax electricus. Linn. Syst. Nat. ed. 12. 1. 3
 . 96.

This substance came from Penzance. some curious
 curvilinear varieties of it from the Logan Peak. some
 from Devonshire. This is remarkable for the largeness
 of the crystals { crystals of this are found more perfect at
 the Borax, in Spain, Switzerland, &c. } though they are
 somewhat confused; but more so still from one end
 passing by fine straight fibres into the Quartz which
 accompanies it, giving it an appearance of a termination.
 The crystallized end is shown at the upper part of the

geometrical figures on the left hand of the plate, and the other end on the lower part of the same figures in fibres.

The other figure is one cut of a gangue of Mica from the neighbourhood of Aberdeen. These crystals are not very regular, but are remarkable for holding some garnets, embedded in them; see the lower figure. Tourmaline by some is said to be distinct from Schorl, some think them only varieties of each other.

Tourmaline generally presents straight prisms; Sir J. Hall is said to possess one crystal without a prism - a great variety, mostly blackish or dark-coloured, sometimes showing a greenish or brownish colour at the transparent edges or flaws. The specimens from the Logan Rock are greenish, but those embedded in Mica brownish. Some foreign specimens are remarkable for varying their colour according to the direction in which they are viewed. Tourmaline is well known for its electrical properties. The crystals have mostly a rich gloss, are smoothish, with one or less numerous striations placed longitudinally on the prism, and horizontally on the pyramids, excepting when they are approaching to fibres, as ^{above} ~~below~~ observed.



Crystallized Soudumalines in the Gangue.

128

Silex Quartzum

Laminated Quartz.

Div. 4. Crystallized.

The nuclei of crystallization often form in plates; but in the present instance, it should seem that, by some interruption of a particular nature in the dissolving medium, the crystal could not be formed so smoothly and regularly, as is common with crystallizing Quartz. and tab. . shows that it may be mixed with much foreign matter without altering the regularity of the crystallization. Thus the present subject is the more remarkable. This sort of Quartz has been found pretty frequently at Glastonbury, in Cornwall, but I do not know if it has been found elsewhere. It has often lain and decomposing. I enquire about it; and whether these or any other decomposable substances have been originally formed with it, and have since caused its decomposing as seems to be partly the case with the pebbles at tab. either way it is a curious circumstance, and may lead to some useful truth in the investigation of the nature

of Crystallography, or to some other part of mineralogical Science.

These are the usual 48-sided crystals incorporated in a peculiar manner.

The right hand figure is in plates a little oblique to the base of the pyramid - or to the transverse section of the column. The middle figure shows them still more oblique: & the left-hand one shows the lamina disposed lengthwise to the column, with an interruption of another set of laminae towards the top. The upper figure has many other varieties.



Plated Quartz.

132

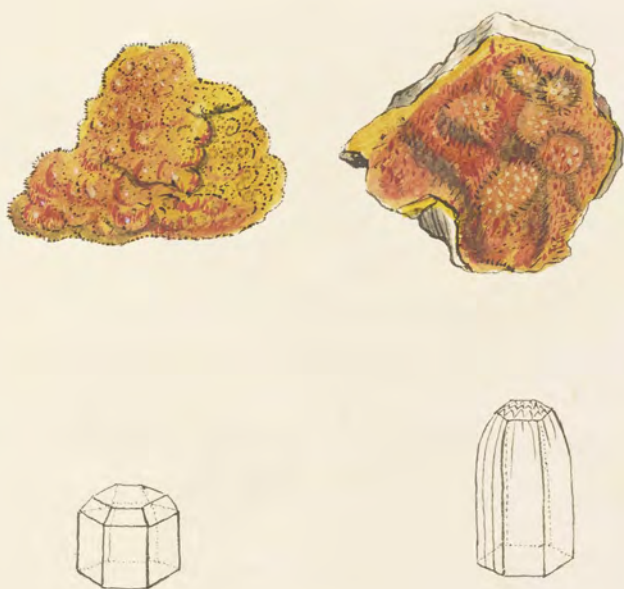
Plumbum phosphatum.

Phosphate of Lead.

Class 3. Metals. Order 1. Homogeneous.
 Gen. 14. Plumbum. Spec. 2. Phosphatum.

Div. 1. Crystallized.

We have already figured Phosphate of Lead Tab. 82. of this work. These beautiful little specimens show the yellow and orange varieties, and two different modifications of the crystals, one bevelled on the horizontal edges of the column (see the right-hand figure), the other rounded on the same edges, approaching such as form spiculae, formed of spiculae side by side, by which we see an example of crystals forming of spiculae or lengthening in their modification to spiculae; which often happens, according to circumstances, as other substances do in plates, as has been most commonly observed. These specimens came from Wadlockhead.



Crystallized Phosphate of Lead.

Barytes sulphata; var. stellata.

Stellata Sulphate of Barytes.

Dio. 2. Imitative.

*Syn. White semi-pellucid Spar. Woodward, 88.
Spec. n. 16.*

Starred waxen-vein. Grew's Museum, p. 312.

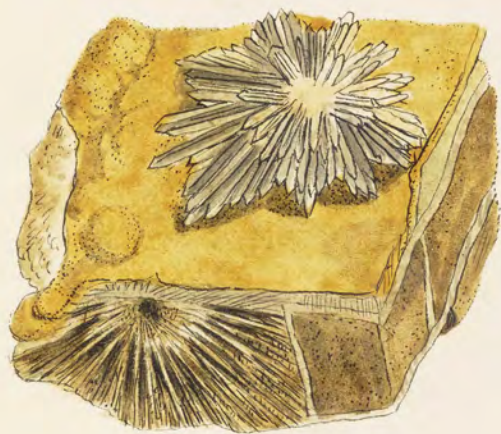
Lepastrum. Hill. p. 146. Tab. 2. Spec. 1. 2.

This substance was once taken for Gypsum, or Sulphate of Lime; but is since found to be Sulphate of Barytes. To those that examine the crystallization it will be easily distinguishable, than by any other external character that we know of.

These varieties of Sulphate of Barytes are chiefly found on the Western side of Shrop, in Kent; The marly cliffs of that place, perhaps raised by the deluge, and full of a great variety of antediluvian relics, have been for years falling down in small or large masses. And from these cliffs are to be seen lumps of marble from the size of an (which egg) Those about this size are some-

-times called sea eggs by some of the quidlers; and when the divisions are lined with the yellowish carbonate of lime, they have a more apt resemblance to eggs. } to several feet in diameter; in which these Sulphates of Barytes are concealed till the snapper break to pieces. The larger bunnies (commonly called Septaria, and formerly *Lucas Helmontii*) } mentioned in another place } most generally contain them in greatest perfection among the divisions or sort of cracks in the insides.

The upper figure is prettily relieved by the delicate yellow carbonate of lime, or waxy vein, as it is commonly called, which fills up the divisions, and the *Lopastus* are generally fixed on the calcareous partitions, which are often crystallized, varying in colour and thickness, and number of coats. This specimen is remarkable for having a Star on the side, placed immediately on the argillaceous marble, which is represented divided by the carbonate of lime.



Stellated Sulphate of Barites.

140

*Calx carbonata; var. inversa.**Inverted Carbonate of Lime.**Div. 2. Crystallized; var. inverted. rhomb.*

When there is much Carbonate of Lime, as at Portland Island, there may be expected much variety. Thus there are some varieties of that sort used for building, see tab. 59. & also some of the crystallized, see tab. 107 & 216 as well as tab. 142. The present specimen is rather a whimsical one, showing how nature sports, yet conformable to a certain regularity. The last aggregation of molecules had apparently formed nuclei of inverted rhombs, arranging themselves something like an inverted pyramid - see left hand figure, tab. 142. The present specimen has a great variety of three sided pyramids, nearly regular, or with prominent sides, { see the left hand lower figure, } and with various kinds of bases, as in the other separate figures.



Pyramidal Carbonate of Lime.

144

145

Calx carbonata; var. radiata.

Madrepore? or Radiated Carbonate of Lime.

Div. 2. Imitative.

*Syn. Madrepore-Stein. Journal des Mines, n. 47.
p. 831.*

Madrepore. Haüy, 4. 378.

This has been rendered of more consequence, since it is a curious example of the utility of the knowledge of crystallization, which in this case distinguishes it from a coral; and might have made the substance called Madrepore better understood. It is said "The Madrepore belonging to the class of calcareous stones, found by M. de Mollé some years ago at Ruppachthal, in the county of Salzburg, is a stone of transportation. Some specimens weigh from twenty to thirty pounds." "Externally it resembles Passate, so much, that some

Mineralogists considered it to be the same; others believed that it was produced from Madrepores; but it discovers no certain characters of a primitive organic formation: besides it has no great resemblance to the real Madrepores, that it has thence borrowed its name. It is of a gray colour, composed of divergent fibres, brilliant on their transverse fracture, and of a black and duller colour on the longitudinal fracture. The fracture exhibits a type of small bent laminae; it is entirely opaque, brittle, rough to the touch, and moderate hardness; the intervals between the bundles which compose it are in part filled with small white leaves of calcareous Spar." There are three or four analyses of this substance, according to Molle, a hundred grains of it contain,

Lime $63\frac{4}{5}$

Alumina $30\frac{2}{5}$

Iron $10\frac{1}{5}$

Analysed by Klaproth, it was found to contain,

Carbonate of Lime	90 00
— Magnesia	0 50
— Iron	1 25
Charcoal	0 50
Sandy Silex	4 50
An atom of Oxide of Mangan ^{ese}	

99 75

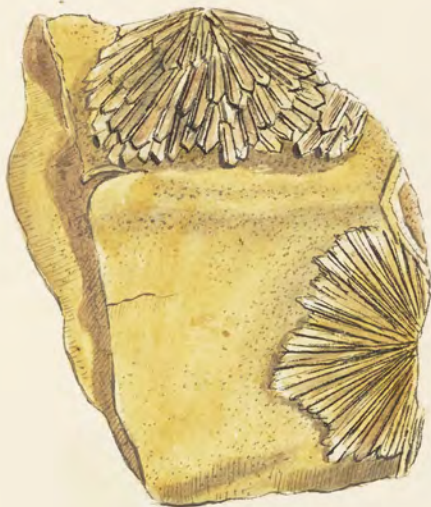
Like the Madrepore at first sight it looks like Basalt and somewhat resembles a Coral, or Madrepore, and shews on the transverse fracture; viz. on the face of the primitive rhomb which discover it: andad we know of nothing in the description that does not sufficiently accord with ours. The small bent laminae are a consequence of the radiation—see tab. 114 This is an example of one of the dullest specimens of Carbonate of Lime of the crystallized and divergent kind, dulled with aduenticious matter: Hence the variations of the analysis.



Radiating Carbonate of Lime, or Madreporite.

Tab. 143.

The *Lepasidii* vary in general form; but not much in their crystallization; that is to say they vary in the height, largeness, and spreading of the group. Thus there are 14 the most general appearances of these aggregated stells, which perhaps sufficiently are described by the figures. It may however be observed, that the ends of the crystals generally incline downwards; indeed they are rarely otherwise. The piece of *Septarium* is covered with two coats in this specimen, as well as the last, but is of the more usual colour. The coat on the left hand side appears to be just forming.



Stellated Sulfate of Barytes.

Calc Carbonate.Crystallized Carbonate of Lime

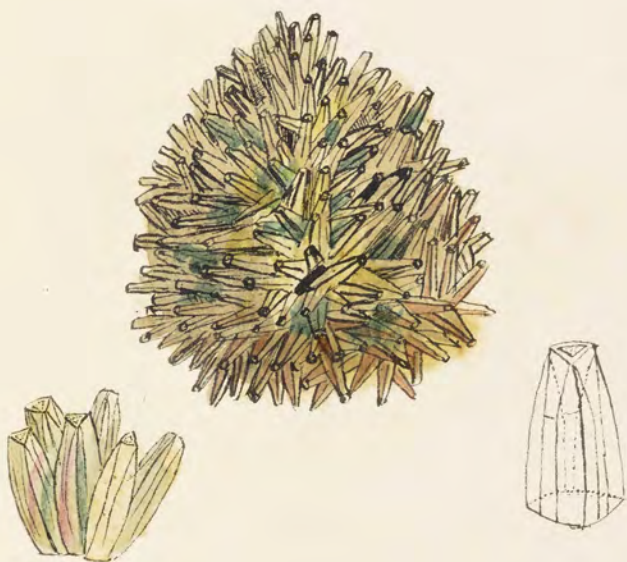
Class 2. Earths.

Order 1. Homogeneous.

Gen. 3. Lime.

Spec. 5. Carbonate of Lime.

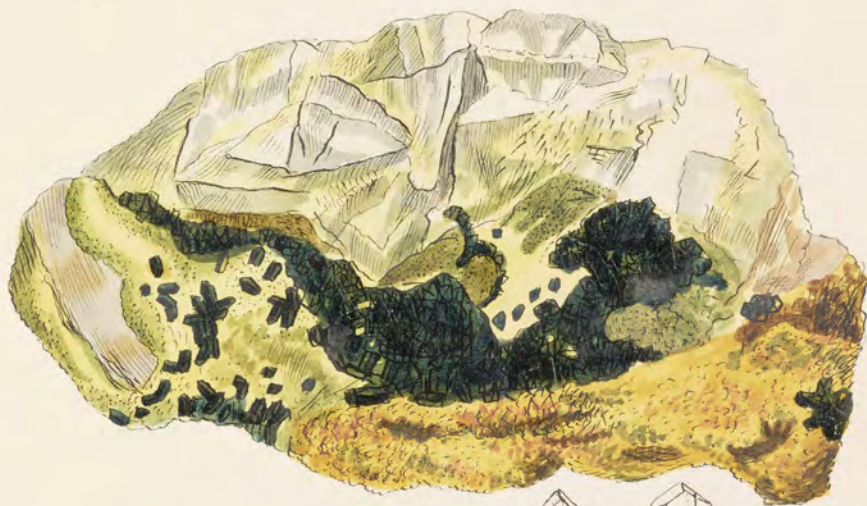
This curious specimen is from Wanlockhead in Scotland. Besides the whole group being formed like a cone, the individuals are a curious crystallization with a three sided column somewhat rounding and truncated at the apex, and a central depression. The sides of the column are again divided into 4 facets, better understood by the figure. The apex is formed by a 6-sided facet: it does not resemble hard Carbonate of Lime. It is formed from the edges of the nucleus or primitive rhomb, with the obtuse angle upwards; the laminae decrease less than in the metastatic, and consequently form a longer pyramid, which, as it is inclined to be rounding, cannot be measured. The truncations nearly on the column & those on the pyramid give it an odd appearance more especially that on the apex, which has a rising margin. The specimen towards the bottom is a little colored with ochraceous Oxide of Iron, & in some parts are a few blotches of decomposing Pyrites.



Crystallized Carbonate of Lime.

Tab. 145.

In describing the crystals on this specimen I may use the words of Count Bournon, who after speaking of the elongated tetrahedron of the other arseniate of copper mentioned in another place, says "The angles of 96° are replaced by a plane which is equally inclined on the adjacent sides, and is frequently very broad. Then the tetrahedral prism is changed into a flat hexahedral prism having two angles of 84° ~~replaced~~ and the others of 138° ." The Count never saw the angles of 84° replaced." The average Spec. Grav. of this Arseniate of Copper taken on five pure pieces was 4.280 ."

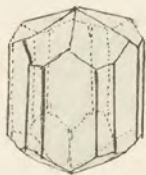
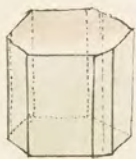
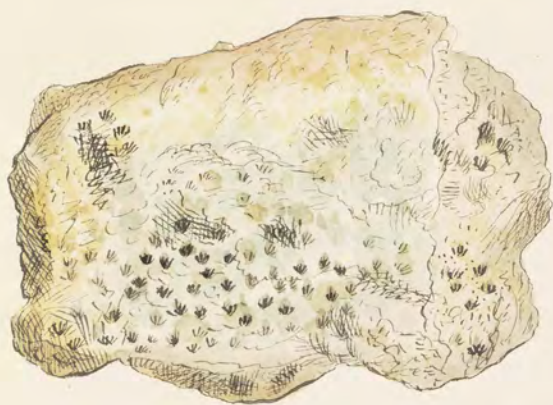


Arseniate of Copper.

163

*Calx phosphata.**Phosphate of Lime.*Div. 1. Crystallized.

This specimen shows some of the varieties in the truncations & bevellings of the hexaidral prism, from the alternating truncated edges - see the upper geometrical figure - to the more complicated - see lower figure. The gangue is commonly talcose with oxide of Iron and with Quartz, sometimes with Fluor, Topaz, & rarely white Topaz, as in this specimen. The prevalence of Talc often gives it a waxy appearance, & this is peculiar to this rock, which, thus differing from the general appearance of rocks, has been supposed to be & even sold for Apatite itself. Apatite has been confounded with Beryl by the Chemist Strommsdorf, who thought it to contain a new earth, which he named Argustine, but now attend. The upper geometrical figure shows the Prism truncated on the three alternate vertical edges. The left hand figure below shows an hexaidral pyramid, placed on the solid angle of the prism. The right hand figure shows facets that are on the horizontal edges & solid angles. The lower figure shows both ends, forming the alternating pyramid, giving 4- and 6-sided facets to the prism.



Varieties of Phosphate of Lime, or Apatite, crystallized.

*Plumbum sulphureum.**Sulphuret of Lead.*

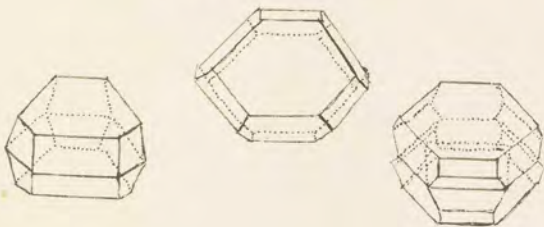
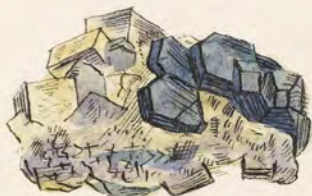
Fig. 1. Crystallized: viz. Cubo-octaedron compressed and mackled.

The primitive cubic crystals of this substance are seen in Tab. 87. It is not rare to see the corners truncated, which are the faces of the octaedron; thus it passes to what has been called the cubo-octaedron - see the description, and Tab. 181. It has been lately observed that Sulphuret of Lead, or Galena, has rarely been found in 6-sided tables; and those who have the few so found, think much of them on that account; and it is certainly a curiosity when we see a substance so decidedly fracturing in cubes to find it forming the octaedron, which it often approaches, and sometimes does most perfectly - that a combination of these forms should be deposited, and at the same time with two of the faces, much broader than the rest, or other 12; viz. six hexangular faces of

the octahedron, and 6-rectangular faces of the cube - see the middle geometrical figures. that these should again be so deposited in crystallizing, as for two to meet with five of the broader faces as a basis to each, of the nature of that of the marble, tab. 91.; and like that they will meet at opposite angles, as if turned on an axis.

Thus the 6-sided faces of the octahedral formation, and the right-angled ones of the cube formation, may meet opposite, as at the right hand figure, or attenuate as on the left hand figures.

The upper figure is from the Marchioness of Bath's cabinet, and contains most of these modifications. The lower one is from a specimen in my own cab. Both came from Derbyshire.



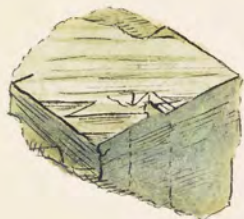
*Hexangular, or 6-sided Sulphuret of
Lead.*

1/1

*Plumbum carbonatum primum.**Primitive Crystallized Carbonate of Lead.*

Class 3. Metals. Order 1. Homogeneous.
 Gen. 15. Lead. Spec. 4. Carbonate of Lead.
 Div. 1. Crystallized.

This specimen is a great rarity, as it does not seem to have been before known that Carbonate of Lead crystallized in rhomboidal prisms. Haüy seems to think the octaedron to be the primitive figure; indeed we have been able in some specimens to trace all but 4 of its fractures; in some respects it is similar to Sulphate of Baryles. The angles of this rhomboidal prism are 76° and 104° ; the laminae are very distinct on all the faces. Carbonate of Lead, when we find it so nearly resembling this substance, may soon be discovered by the help of the blowpipe in procuring a little globule of Lead from it on the charcoal. They both form a nearly opaque glass; but if the heat is continued, the one will of course be reduced to Lead, and the other will remain unaltered.



Primitive crystallized Carbonate of Lead.

175

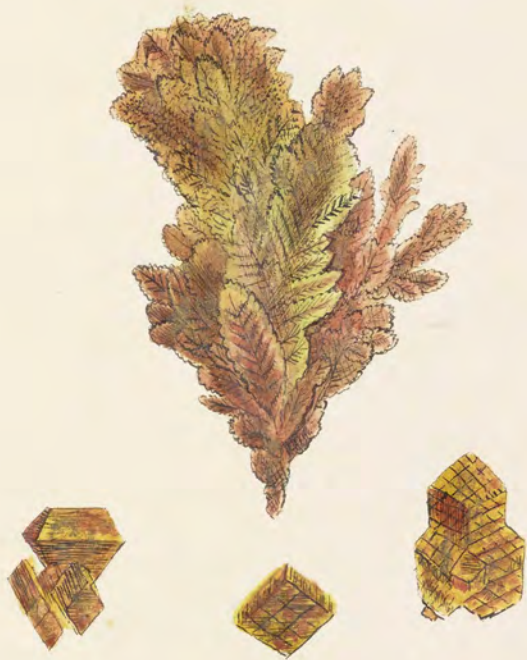
*Cuprum nativum.**Native Copper, Leaf-like.*

Class 3. Metals. Ord. 1. Homogeneous.

Gen. 10. Cuprum. Spec. 1. Nativum.

Div. 2. Imitative.

This is nearly in a pure state, comes from Huelvor near Redruth in Cornwall. curiously shows how the Copper is held in solution, and the solvent subsiding from it, leaving it in a state to explain the nature of the particles cohering, while supported by a sort of reciprocal gravity in the solvent, which allowed it to expand almost in distinct nuclei, by masses in the form of leaves (Minerals approach nearer to vegetables than have generally been suspected. The present specimen resembles the *Fucus Hypoglossum*, or *vasciformis*, in the leaflets coming from the middle of the larger foliage.) The primitive rhomb has not been before noticed; it seems in this instance to form into the octahedron; — see the left hand figure. The other figure shows the 2 sides of the plates chiefly formed of rhombs. These being irregular could not be measured. The octahedron — see the left hand fig. — and the rhombs in its direction seem to agree with the native coppers, and partly modify prismatic plates as they partly do in these specimens, and into consequently double hexahedral pyramids; see tab.



*Native Copper formed into Leaflets, from
Cornwall.*

Silex Talcum.

Talc.

Div. 4. Crystallized.

Syn. Talc, Venetian Talc. Kirw, v. 1. 130.

Talc. Haüy, t. 3. 252.

Chlorite. Kirw. v. 1. 147.

Talcum viridans. T. lamellare, and many

others. Linn, ed. 13. t. 3. 51. et seq.

Mica Talcosa. Ibid. t. 3. 59.

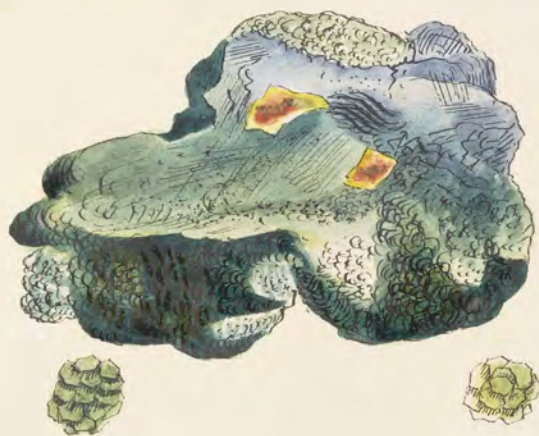
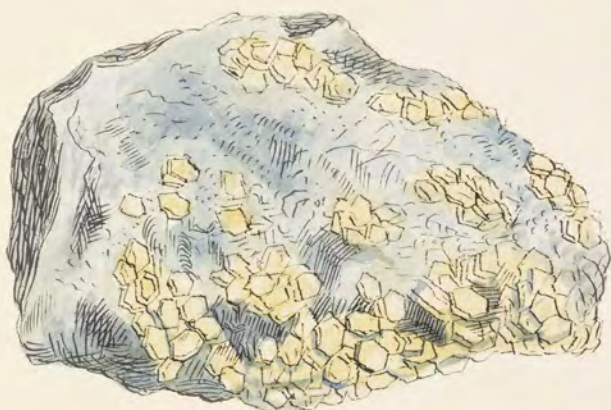
Talc. Emmerl. t. 1. 391.

Chlorite is not a scientific name, according to our present improvements in mineralogy, as it is perfectly confined to a green variety of Talc, found either in small lamina-ted crystals, granular fragments or masses, or disseminated through Quartz, &c. Its grain is sometimes very fine. I find in this latter state it is scarcely known by any one, or any green earthy substance may be confounded with it. Talc and Mica, as observed under tab. 128, have been till lately much confounded; but M. Kirw. has since more defined it. The Upper specimen came from

Stenna - Gwynn in Cornwall, where it is found in abundance, often holding Phosphate of Lime, among Quartz, and decomposing Seltspar; whence the rock itself is often called Apetitite, the old name of Lime. Abundance of Oxide of Iron often accompanies it. This is a variety of Talc, agreeing with that called Chlorite in every external character except colour, which instead of being green is that of cream. The lower specimen has the usual colour of Chlorite, which is undoubtedly to be attributed to a large adventitious mixture of Iron, which at the same time renders it easily fusible. Mica and Talc seem to have the same forms in their crystals, but Mica is not so well defined. These crystals are very soapy to the touch, particularly if bruised. The laminae are easily broken, and divide in minute greasy scales; which property has rendered this fossil an ingredient in cosmetics. The white varieties are difficultly fusible. White Talc analysed by Floëpfner was found to contain:

Silex	.. .. . 50
Magnesia	.. .. 44
Argil	.. .. . 6
	<hr/> 100

Chlorite by Vanuquelin:	
Silica	.. .. . 26.0
Argilla	.. .. . 18.5
Magnesia	.. .. . 8.0
Oxide of Iron	.. .. 43.0
Muriate of Soda	
2 Potash	.. .. . 2.0
Water	.. .. . 2.0
Loss	.. .. . 0.5



Crystallized Tale, Chlorite, &c.

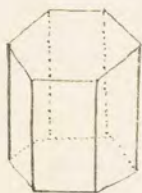
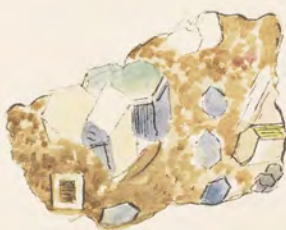
Calx carbonata.

Phosphate of Lime, or Apatite.

Class 2. Earths. Ord. 1. Homogeneous.
 Gen. 3. Calcs. Spec. 3. Phosphates.
 Div. 1. Crystallized.

Syn. Gemeiner apatit. Emmerl. 1. 502.
 Chaux phosphoree, Apatite. De Born, 1. 363.
 Calx combined with Phosphoric acid. Kirw. 1. 128.
 Amethyste basaltine, De Lisle, 2. 254.
 Chaux phosphatée. Haüy 2. 234.

Apatite has not long been known as a native substance of Gt. Britⁿ it has only been found at Stenna-Gwynn, Corn^w. In many instances the crystals are so small & so much imbedded in talcose rock as scarcely to be seen, & not uncommon for the Pick itself or Gange to be thought Phosphate of Lime altogether. This specimen is curious as it shows the primitive crystal, & the nature of its fracture which is distinctly seen. it also shows some of the various tints, such as purplish, bluish and greenish, natural to it though rather pale; & since rec^d a fine opaque white specimen - water blue it is in length. Apatite is infusible by the blowpipe. Powdered, & thrown on red hot coals it emits a red hot yellowish green phosphorescent light. Soluble in mucic acid & the solution becomes gelatinous. This plate shows the integritate molecule, a regular triangular prism. fractures distinct & also the primitive hexangular prism. in Spain & Germany it constitutes large mountains.



Phosphate of Lime, or Apatite, crystallized.

Ferrium suboxygenatum.

Suboxide of Iron. Magnetic Iron Ore.

Div. 3. Amorphous, in Grains.

Sowerby received some sand from Humstanton, in Nor-
folk, of a blackish appearance. On looking attentively
at it he thought attractible iron might be the cause
of the blackness & found it to be so.

Some was found in a common looking
bag at Scarborough, some when he received some
Iron Sand from Wicklow. In examining this it
evidently betrayed its habitat by minute particles of
feldspar, besides which it has detached Iron Ore more
or less oxidized and some cubic Pyrites, Pebbles &c.

Sowerby also received some *Arcua ponderosa*
as it is called from the River of Ardentinny in
Argyleshire, where it is found in great abundance
washed out of the banks of the sea. It was
brighter with detached crystals, small, black, abun-
dant, and very attractible.

The right hand upper figure
is of the pebbles and sand from Humstanton in

a heap, and the particles of Iron of the size generally found, by the side. The figure underneath is such as is found when the sea has washed it and oxidized it. The fine pebbles on the side magnified are three common Quartz pebbles, which compose common sand, and two darker, chiefly Oxide of Iron. The left hand upper figure is the Irish sand, and the figures on the side show the retention of Lime, Gold, and Pyrites. Beneath is the outline of a magnet, and the Iron in common as attracted by it at the base. The middle figure is a parcel like that from Scotland, or such as has been separated from the other sands.

Thus it appears that this sort of Sand, which was supposed to be only found in America, has now been produced from England, Scotland, Ireland,



Magnetic Iron Sands from different places.

1851

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Prehnite

Class 2. Earths. Order 1. Homogeneous.

Gen. 4. Silae. Spec. Prehnite.

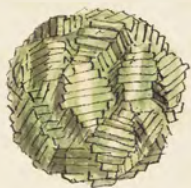
Syn. Prehnite. Haüy, 3. 167. Kien. 1. 274.

Schort en gombes de Schrieber, Prehnit. Emmert. 1. 192.

Leolithe verdâtre. De Born, 1. 203.

Chrysolite du Cap. De Lisle, 2. 275.

Prehnite was said to have been first discovered by Col.^{le} Prehn, who brought it from the Cape of Good Hope; Haüy says certain Puchon was beforehand with him. It is now found in many parts of Scotland. This specimen came from Inverbarrow, and when examined exhibits a curious arrangement of crystals, in groups, forming hemispherically, and showing faces which are the edges of tabular crystals arranged somewhat in segments of circles, having the larger crystals in the centre, see the Left-hand lower figure. These crystals seem to betray signs of 8 faces besides the two broader ones, like the right-hand figures. The nucleus could not be determined; it seems however, to be a nearly rectangular table, as expressed by the dotted lines; thus the corners are as it were unfinished, or truncated. The Upper figure is of the natural size; The lower one, for the sake of explanation is magnified. This fossil lines the cavities of a sort of Stragg of Peruvian. The Crystals are also found at Salisbury Craig. The substance is sometimes found amorphous, as at Kinnaird Park.



Crystallized Pehnite

Calce carbonata, var. ferrifera.

198

Ferriferous Carbonate of Lime.

This specimen came from Anduin mine 8 miles from Bodmin, Cornwall. curious as some have said Carbonate of Lime was not to be found in that County. The white part of the specimen is a cavity handsomely filled with crystallized Carbonate of Lime of a very uncommon modification, being nearly a hexagonal plate with the equiax and primitive bevellings, if they may so be called. it is curious the external surfaces of these crystals are whitish and the inside a rich dark brown, as the dark or surrounding parts show. Tab 162 British Mineralogy is nearly of the same nature, but under common exposure to the air becomes blacker. This specimen has many other curious circumstances of change and position of mineral substances attending it: viz. the redder parts are a sort of Carnelian Quartz somewhat approaching Chalcedony, coloured by a rich Oxide of Iron, and this is sometimes covered by Cachaion: see British Min? tab. 188

Besides this there are yellow spiculated tubes, at
 most crystallized, radiating, &c. These are to be seen
 as forming over wire-shaped Pyrites; see British Min.
 tab. This has decomposed in some parts, leav-
 ing the hollow where it has been with enough to
 show the appearance of a wire as the fracture in
 some parts on the opposite side shows; perhaps
 it may be between Eisen Heisel, or the German
 Iron flint, and Carnelian. Some gray cal-
 =ation covers the carnelian in the hollow as
 represented at the top of the figure. The
 yellow Quarts seem to be coloured by yellow
 oxide of Iron, probably the decomposed Pyrites.



*Ferriferous Carbonate of lime with calcedony and
quartz.*



*Cuprum carbonatum.*Tab. 155.Carbonate of Copper.

Class 3. Metals. Order 1. Homogeneous.

Gen. 9. Copper. Spec. 3. Carbonate.

Div. 2. Imitative.

This specimen is ^a rare modification of carbonate of copper.

The upper figure is remarkable for being on the broken end of a large milky rock crystal. The other stands on the crystallised end of the rock crystal, & is a much larger specimen; part of it only being figured.

This mineral was first considered as an arseniate of copper, but we have every reason to suppose it to be a carbonate.

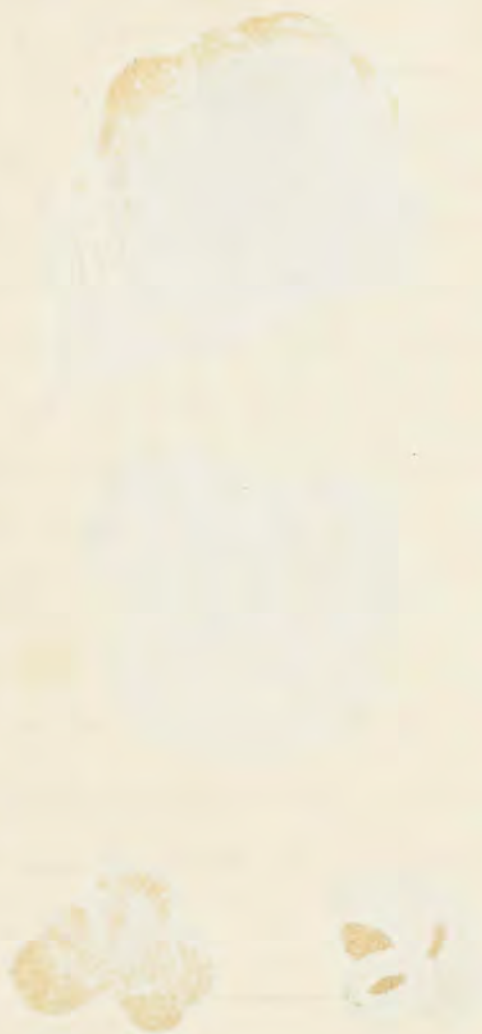
The specimens are curiously disposed like radii round the edges of a thickish lenticular nucleus.

Both specimens are accompanied by a few crystals of each variety of arseniate of copper, fig. at Tab. 97.



Peculiarly Radiated Carbonate of Copper
Cornwall.

205



Barytes sulfata.

Sulphate of Barytes.

Class 2. Earths.

Order 1. Homogeneous.

Gen. 6. Barytes.

Spec. 2 Sulphate

Div. 1. Crystallized.

This curious specimen came from Cumberhead lead mine, at the head of Nethan river in Ayr-shire.

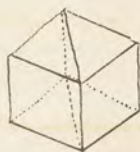
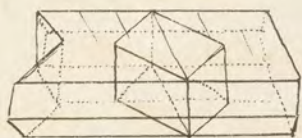
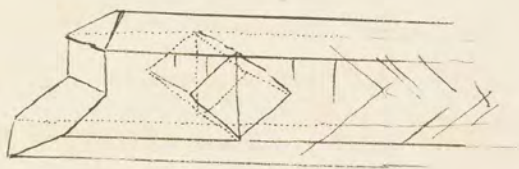
It is remarkable for the crystallized sulphate of barytes being immersed in amorphous sulphate of barytes.

Not having before seen a fracture that indicates the integrant molecule, this is made use of to show the form of one. It is certainly very rarely to be fractured parallel to all its faces, some of which are not to be seen, & it should seem that Haring had only observed them by the scintillations within the crystal. To explain the nature of the crystals formed in the upper figure, a distinct outline is drawn in the middle one, including the nucleus, to show its situation. It will be easily seen that the perpendicular face at the left hand end (the faces at this end are all fractured ones) is parallel to the diagonal division

of the nucleus, and the oblique fracture is parallel to one of the faces of the rhomboidal prism; the perpendicular lines indicate a continuance of the diagonal fracture, the others a continuation of the rhomboidal fracture. These are extended in the specimen more or less perceptibly until lost in small nuclei, at the right hand end of the crystallisation.

The third figure may help to familiarise these things by its being placed in another position, and showing similar facts. The lower figure shows the geometrical divisions of the nucleus into two molecules, by means of this fracture parallel to the shortest diagonal of the rhomb.

Having seen this, we cannot doubt the opinion of Haid, that there may be a fracture parallel to the longer diagonal, dividing the molecules above mentioned into two: Thus four upright triangular prisms form the rhomboidal prism or nucleus, each being an integrant molecule.



Sulphate of Barytes in transparent crystals, included
 in amorphous Sulphate of Barytes.
 Scotland.

[Faint, illegible handwriting, likely bleed-through from the reverse side of the page.]

Silix Quartzum. Tab. 157.

Div. 1. Crystallized.

These various specimens are said to contain Arsenical Cobalt. They came from Pottlency mine, and are rare, on account of the mine having been destroyed by the overflowing of a river. The Quarts are more regularly 18-sided than usual, although it is as if were clogged up with such abundance of a metal, that it otherwise would be nearly obliterated in its character; and that it should crystallize under such circumstances, distinctly and at both ends regularly, nearly as if heaped on each other, as in the top figure is very remarkable. There appears to be little else than Arsenical Iron among them, but capillary Silica and flowers of Cobalt are sometimes to be seen very distinctly about the gangue.



Crystallized Quartz said to contain Cobalt.

This specimen came from Hartfield near Paisley, and leads to a curious modification. The crystals are arranged in double stellated groups, the radii of each extending so as to meet at the edges, like the spokes of two wheels placed against each other, contrary to their position on carriages; the periphery of the wheels coming together, the edges forming one coracular face; see the left and right hand figures. These are grouped among roughish indistinct semi-orbicular masses. The colour is not so attractive as the formation being dull and brownish. This mineral is formed in the cavities of Kragg rock somewhat approaching Porphry.

The crystals are nearly similar to those of tab. 153. but the secondary faces being larger, the terminal one is lost in an edge.



Crystallized Prehnite, a variety.

Cuprum arseniatum.

Arsenate of Copper.

Class 3. Metals. Order 1. Homogeneous.
Gen. 9. Copper. Spec. 8. Arseniate.

Syn. Bournon. Phil. Trans. for 1802.

This beautiful specimen of Arseniate of Copper came from near Guenep. The crystals are spoken of by Count de Bournon as his third variety, "perfectly regular for a part of their length, and fibrous at their extremity." The present specimen has these crystals with apparently 4 sides of the octaëdron, lengthened into filaments, and diverging a little from the centre, forming altogether a sort of brush, narrow at the base, widening towards the apex, and terminating a little abruptly in a sharp or angular point. They are of a dark dull green, somewhat transparent, the ends being generally more opaque and lighter, owing to their fibrous nature: some crystals are of a darker green colour and more confused: see the left hand figure.

The gangue is chiefly quartz, somewhat platy and ochrey, and has intermixed with it bright green arseniate of copper in irregular granula: see the right hand figure.



Pencilated Arseniate of Copper.

224-

Div. 2. Imitative.

This variety of sulphate of Barytes has obtained the name of such among the miners; but for what reason Sowerby knows not. It has also been called *terra ponderosa*. This sort here figured is frequent in Eton mine, Staffordshire. It is not uncommon in other places, but of a less regular spherical form. It is generally accompanied by carbonate of Lime, fluor, galena, blende, iron, and copper pyrites, &c. and is most frequently white. Sometimes it is coloured by oxide of iron, & is then yellowish or reddish. The Upper Specimen came from Eton mine, and is accompanied by calcareous spar and pyrites of various forms & hues. The internal structure is wonderfully laminated, showing signs of crystallization, arranged in the form of a shell sphere; these laminae are extremely close, & often confused, or so thin that no determinate form can be made out having only the appearance of segments of concave plates, thickening edgewise by the side of each other. See tab. 100.

The whole are sometimes attached by a greater or smaller base, so as to be nearly detached spheres; at other times only half a sphere or less.

At Buxton in Derbyshire, detached balls are found, not far underneath the surface of the common earth: see the three figures in the middle.

They seem to formed among foam, and partake of an ochraceous hue: The edges are frequently more separated, and less regularly rounded. They have occasionally attached to them single cubic crystals of fluor in a decomposing state: These are some-
 -what related to the celebrated Bolognian Stone, which shines like phosphorus in the dark; & if heated red in the fire does the same. They are allied to the Liver-Stone { found in Adriaticum, in Scania } which has its name from its hepatic scent, derived from sulphuret of ammonia, or liver of sulphur. Varieties are found in Great Britain, which when rubbed give nearly the odour of Stink-Stone: See Tab. 20.



1-96

*Sulphate of Barytes in irregular crystallized
nodules commonly called Cauck. Staffordshire.*

*Silix baryticus.**Harmotome* or *Staurolite*.

Class 2. Earths. Order 1. Homogeneous.

Gen. 4. *Silix*. Spec. *Barytic*.

Spec. Char. Combined with Barytes and Argil, fused into a frothy enamel, with a greenish phosphorescence.

Syn. *Staurolite*. Kriw. 1. 282.*Harmotome*. Haüy, 3. 191.*Kreuzstein*. Emmerl, 1. 209.*Hyacinthe blanche cruciforme*. De Lisle, 2. 299.

De Born, 1. 79.

British *Staurolite* has only been observed hitherto at Strontian in Scotland, a place famous for Carbonate of Strontian - see tab. . It is generally found on a gangue of Carbonate of Lime, which is mostly crystallized. Its common form is a quadrangular prism, with the lateral solid angles truncated, and forming a 4-sided pyramid, alternating at each end; or in other words, making an elongated dodecahedron, similar to that of garnet, but not of the same angle. Two of the opposite edges of the pyramids

are mostly truncated, in British specimens. The crystals are generally larger than in those of Andnashberg, and more nearly resemble those of Olarstein.

Fluorspar is chiefly admired for often assuming a cross form appearance, looking like five crystals, four being united round a fifth. It appears however to be a regularity in the aggregating of the sides, without a sufficiency to fill up the lateral edges - see lower figure.

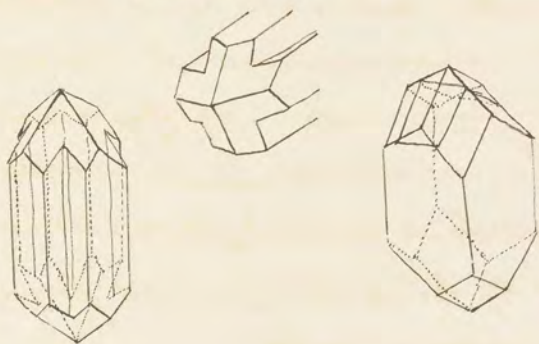
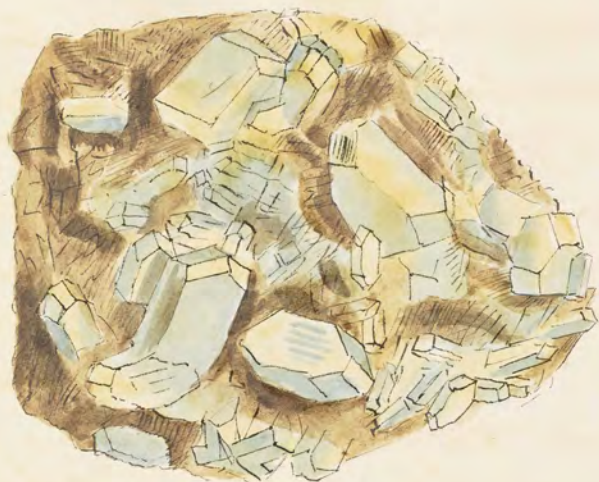
They have been called twin crystals, as if two had passed across each other. The whole appearance is somewhat glassy, of a bluish pearly lustre, having a foliated fracture on the broader faces. In other respects it is somewhat conchoidal, and hard enough to scratch glass.

Insoluble by the blowpipe into a frothy enamel. It does not form a jelly when combined with acids. But if thrown on charcoal it emits a yellow phosphoric light.

On analysis by Klaproth it was found to contain

Silica	- - - 49
Baryt	- - - 18
Argil	- - - 16
Water	- - - 15
	<hr/> 98

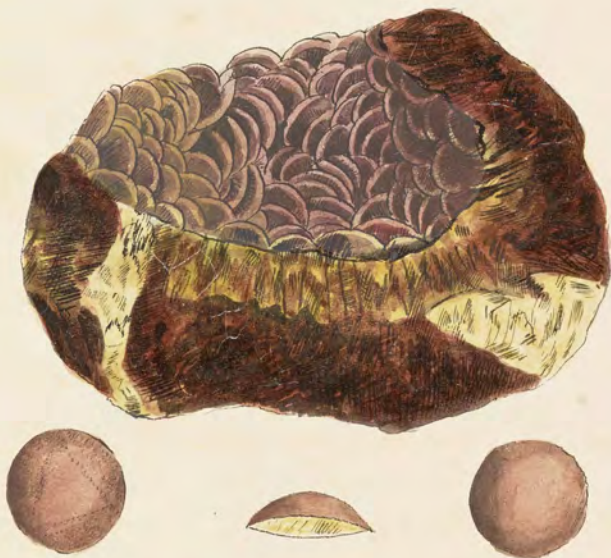
The primitive form is said to be an octahedron, divisible in the direction of the diagonal diagonals of the mutual base of the pyramids, so as to form 4 singular tetrahedrons, or separate 4 solid angles, leaving a rhomboidal doicahedron, which might perhaps with more propriety have been called the primitive, to save confusion.



Staurolite or Cross Stone.

232

This is nearly the same as. *Calc carbonata ferrifera*,
var. *lenticularis* see p. 239. with very flat lenticular
crystals standing edgewise, of a dull rusty appearance
the matrix nearly of a similar substance, with
some lustre. The whole shows the gradation of
tints, and the fresh fractures are lightest, as is
common in these varieties. The left hand fig.
has some signs of the triangular and other
faces partly remaining; in the right hand
figure they are entirely lost; The middle
figure exhibits a transverse section, fresh
broken, with signs of the confused rhom-
boidal fracture.



1-63

Lenticular Crystallized Carbonate of Lime.
Tavistock.

Calx carbonata ferrifera, var. lenticularis.
Spathose Iron Ore; Lenticular crystallized
Carbonate of Lime.

Class 2. Earths.

Order 1. Homogeneous.

Gen. 2. Lime.

Spec. 4. Carbonate of Lime.

Syn. Calcareous or Sparry Iron Ore. Kirw. v. 2. 190.

Spathose Iron Ore. Bab. 201.

Spathiger eisenstein. Emmert. v. 2. 329.

Chaux carbonatée ferrifère lenticulaire. Haüy, v. 2. 178.

Mine de fer spathique. De Lisle, v. 2. 281.

This singular group of Spathose iron ore, as it is often called when gathered with the iron ores of Devonshire, may with as much propriety be called calcareous Spar. The crystallization is found to be as it were intermediate between the latter and the former. The top left hand figure shows the primitive rhomb somewhat flattened, formed by aggregations of the primitive rhombs of calcareous spar. See Tab. 38. 39. 61 The right hand upper figure differs only in having the apex truncated, and the edges having rounded facets. The lower left hand figure shows the same with the rounded facets having become the principal faces of the crystal. It is altogether rather flatter and rounder.

The lower figure on the right hand is still flatter and rounder, and approaches more to the iron appearance. The first is a pearl spar of the usual light appearance, the second more coloured with iron, the next more so still, and the last most of all. They may perhaps contain a little manganese. The outline shows the position of the primitive rhomb in the upper figures, in the others it is situated as in the aquamarine. Some specimens came from Devonshire, some from the Isle of Man. They seem to indicate iron in their neighbourhood, and may be useful in smelting it; but are themselves very deceitful; their appearance giving a stronger indication of iron than belongs to them: which will in general be detected by breaking, as the fresh fragment discovers them to be a mere lime-stone with a slight pearly tinge, which on being exposed to the common air and water will assume the same deceitful tinge as the former exposed parts. These have generally been reckoned among the lenticular ores, and may have deceived many by their external appearance.



1-62

Carbonate of Lime, variously coloured by Oxide of Iron.
 approaching the Selenitiform. Crystallized with
 various modifications. Savistock.

*Zincum sulphureum; Var. cubicum.**Cubical Sulphuret of Zinc, or Blend.*

Class 3. Metals.

Order 1. Homogeneous.

Gen. 6. Zinc.

Spec. 2. Sulphuret of.

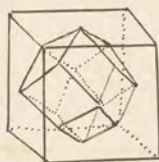
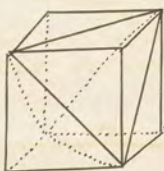
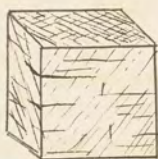
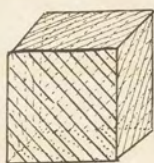
Div. 1. Crystallized.

The rectangular or cubical formation of these crystals of Blend is, quite new to the Mineralogical World. Two specimens have been sent from Cornwall, one marked from Tincroft, the other from Polgooth, and were probably from the stores of a miner who did not exactly know from what mine they were brought. The cubes of this specimen curiously show the diagonal striae, and indicate the accumulation of plates upon the rhachidrons, or more common modification. It may not be amiss to remark that several other substances are striated in the direction of their principal modification, as Fluor, whose primitive is an octahedron, but is generally striated in the direction of a cube; Oxide of Tin, &c. This arrangement of striae is apt to mislead inexperienced observers. See these more plainly marked on the

upper right hand geometrical figure.

The right hand figure shows these marks more faintly like the original with the marks of the fracture parallel to the edges - see the figures beneath, which if carried regularly on every edge, would produce the rhomboidal Iodicaedron, one of the characters of Blend. The gangue is mostly copper Pyrites.

Since acquiring this specimen Sowerby has met with a finer one from Cornwall with smaller distinct cubic crystals, or rather separate ones, much resembling Pyrites: The diagonal stria however help to detect it. They are nearly gold-coloured, and iridescent externally, but dark like Blend within.



Cubical Blend. Cornwall.

*Ferrum oxygenizatum.**Soliated Oxide of Iron.*

Class 3. Metals. Ord. 1. Homogeneous.

Gen. 7. Iron. Spec. 3. Oxide of Iron.

Syn. Plumbaginous or Micaceous Iron Ore. Kirw.

v. 2. 184.

*Eisen - Glimmer. Emmerl. v. 2. 306.**Fer oligiste 'écailleux'. Haüy v. 4. 45.*

This curious variety of Iron ore is found in Wales, Scotland, Cornwall &c. It has the appearance of Iron with somewhat of the gloss and the blackish grey tint of black lead, occasionally with the blue, purple and sometimes the other iridescent colours. It is more or less flat, irregular or undulating, in very thin broad laminae, one over another. They have two sets of parallel lines crossing each other obliquely, and forming the plain of a rhomboidals. It is found in rocks of quartz, and the upper figure has some yellowish mica about it. The right and left hand middle figures show the parallel lines crossing some fragments,

and the undulating structure. It is not attracted by the magnet. It is very brittle, and easily breaks into small irregular fragments. The sparkling middle fig. is known by the common name of glimmer, or staly iron ore, and often accompanies the above, as well as the black and red hematites. It is blackish or red occasionally. The little bright faces of the scales reflect the light with great brilliancy, particularly by candle light. { The engraving I copied this from the very substance was used to represent it. } The biggest figure is among broken quartz or rock, covering the surface or filling little holes in a scattered manner. The lower figures are aggregated bundles, which are often found much larger: they have sometimes a tendency to crystalline in small rhombs, but I never saw any distinct enough to be measured. The angles appear to be the same as in the foliated part above, to which the lower evidently belongs. It is found in Devonshire. The same from Scotland. The upper one was received from Wales.



*Specular or Micaceous Iron Ore. North Wales and
Devonshire, &c.*

250

*Silex analcimus primitivus.**Cubical Analcime.*

Class 2. Earths.

Order 1. Homogeneous.

Gen. 4. Silex.

Spec. Analcime.

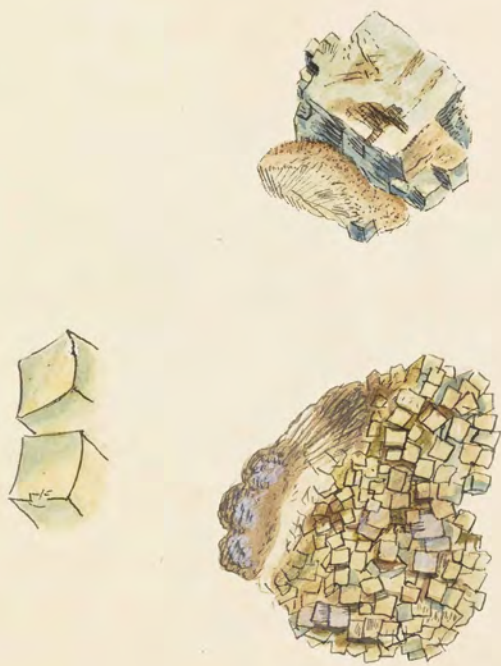
Div. 1. Crystallized.

Although the Cubic Analcime of Hainy, or what is still by some called Cubic Leucite, is not rare in some parts of Ireland, especially among basaltic rocks, yet we have had very little amount of it. The present specimen came from Carr Hill near Belfast. Hainy distinguishes this fossil as having fractures on the six faces {Those of the cube}, or in three directions only; but these specimens are not always easily procured. It is however sufficiently distinct from Fluor by its superior hardness, easy fusion into a transparent white glass without ebullition, and want of phosphorescence; having indeed all the characters of tab. . except its form. Lomerly has met with suspensions of this with

other Analcime, as well as small crystals imbedded in the radiated Analcime, or what is by some called radiated Zeolite, in the holes of basaltic Trap, if it may be so called, for it certainly is not Lava, with which this sort of Trap has been confounded. Sowerby hopes soon to be able to explain the difference, as to the nature of Basalt & Volcanic Trap which has caused so much argument.

The upper specimen shows an almost independent largish crystal. The lower specimen is a considerable group of small crystals, with sometimes curved or concave faces marked with diagonal striae; see the lateral magnified figure.

This substance in these shapes occurs in many parts abroad, as well as in Scotland; but Sowerby does not think it has ever been mentioned as found in Ireland before.

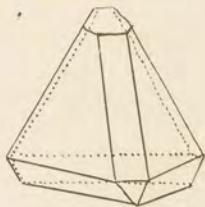
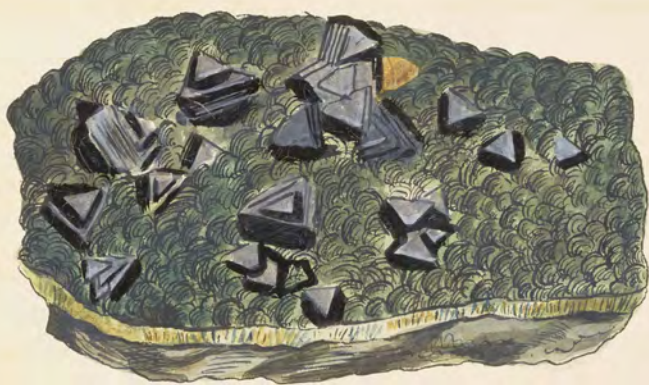


Cubical Analcime.

This is the same substance as *Linum Sulfuratum* see Tab. 196. The crystallization is a very curious one. The edges being truncated adding 6 faces which, with the truncations and the solid angles spoken of in Tab. , make 14 faces. The latter faces may be triangular, like the three bottom ones, or hexangular like that at the top.

These are on a gangue of somewhat dirty green Chlorite and quartz with Pyrites. The nature of the accumulation will be seen ^{where} ~~where~~ the primitive form is figured.

The well known semimetal zinc, is often used as a principal agent in galvanism, for making of brass, &c. is extracted from this ore.



Tetraëdral Blend or Sulphuret of Zinc, Truncated.



Epithema, caroliniana

Epithema, caroliniana

Epithema, caroliniana

Epithema, caroliniana

Epithema, caroliniana

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Epithema, caroliniana

*Cuprum arseniatum.**Arsenate of Copper.*

Class 3. Metals.

Ord. 1. Homogeneous.

Gen. 10. Copper.

Spec. 8. Arsenate of.

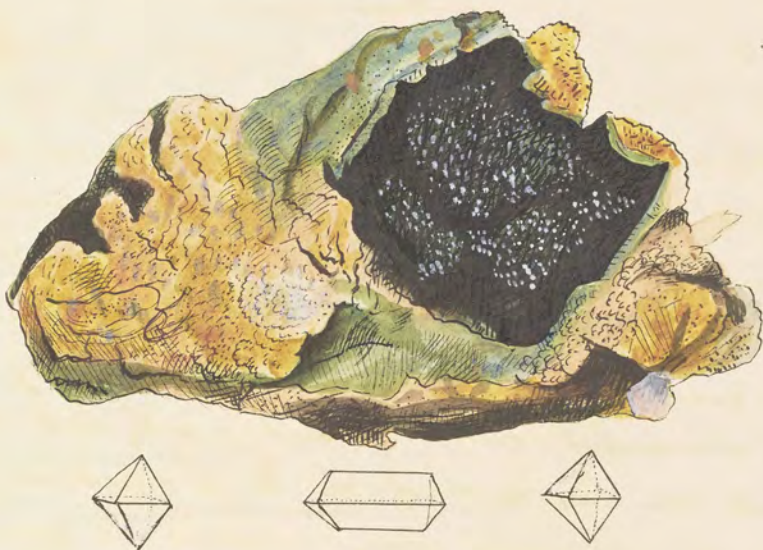
Div. 1. Crystallized.

Syn. Arsenate of Copper. Bowen. Phil. Trans. 1801.

This is the 3^d variety of Arsenate of Copper, which the Count de Bournon calls the acute octaëdron, in which the more inclined planes meet at an angle of 84° , and the others at an angle of 68° . The first variety or obtuse octaëdron is fig. in tab. 97. and 90 and the second variety in hexaëdral plates tab. 66. The present is mostly of a darker colour than the others, commonly a bottle green. Like many crystallizations it is somewhat rounding but mostly with concave faces, which are here noticed in the geometrical figure as well as the straighter one, and also the manner of the elongation of the octaëdron towards forming a prism, which is often assumed by being placed on one end; thus at first sight giving a new idea, and forming a 4-sided prism with a diëdral summit.

By the analysis of M^r. Chenevix, this species is found to contain

Oxide of Copper	60
Arsenic Acid	39.7
	<u>99.7</u>



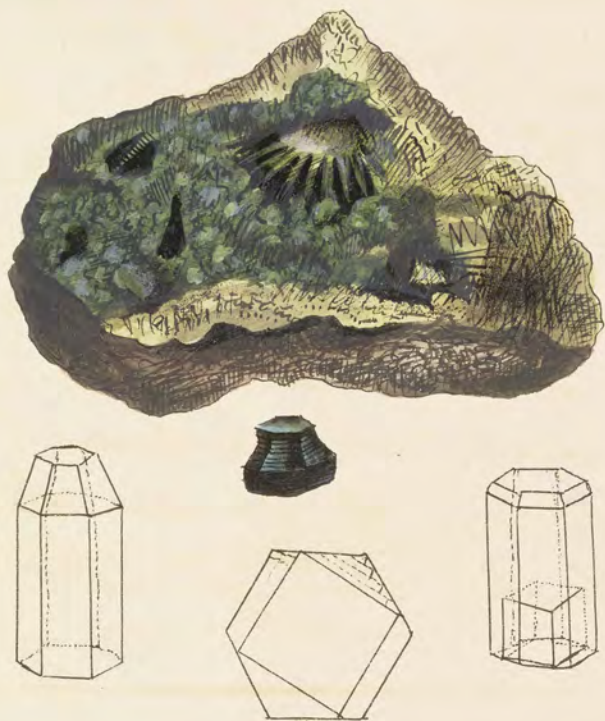
Arseniate of Copper.

The variety of this substance in determined crystals, especially in Great Britain, is a sufficient cause for giving a specimen of the present appearance, which has no pretensions at first sight to value. Experience, however has shown us that in some things that rarely crystallize a characteristic specimen is a tolerable prize. The present has some small but determined crystals when examined carefully with a lens, and the little middle figure is a singular formation of hexangular plates, which being deposited at the lower part regularly in equal-sided plates, form an hexaedral column. Those immediately above the column, diminishing by degrees, form part of a pyramid; and a few plates of a little larger dimensions, hanging slightly over at the apex, seem to explain by this small irregularity, that the plates formed before they were deposited. The lower middle outline explains the primitive rectangular figure, and the accumulation on the sides, forming the hexaedral plates. The right hand geometrical figure shows the rectangular primitive or cubic form within the column, which by a little thought may by a tyro be comprehended as

the primitive form that accumulates to that of the left hand figure. The hexangular column has 4 angles of 121° and 2 of 118° .

The gangue is composed of Chlorite, Quartz, Oxide of Iron, and Arsenical Iron, or Mispickel. The specimen comes from Cornwall.

Tungstate of Iron has not, that I am aware of, been found otherwise than crystallized, although the crystals are almost always interrupted. It may be known from most other substances by its pectinate fracture, which in the tabular crystals is perpendicular to their larger faces. It may be scraped by a knife giving a chocolate brown powder.



Scheelite of Iron, or Wolfram.

266

268

Barytes carbonata.
Carbonate of Barytes.

Class 2. Earths. Order 1. Homogeneous.
Gen. 6. Barytes. Spec. 1. Carbonate of Barytes.
Div. 1. Crystallized.

Gen. Char. Suberulent, white somewhat pungent. Grav. 400. Soluble in most of the acids, & in 900 times its weight of water. Its nitrate does not tinge flame red. Its sulphate is nearly soluble. It forms a kepar with sulphur, which is poisonous.
Bab.

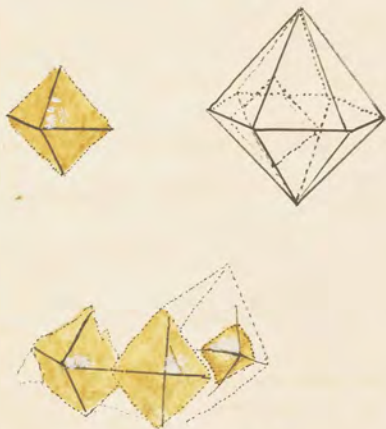
Spec. Char. Combined with carbonic acid.

Syn. Barolite or aërated barytes. Kir. v. 1. 134.
Witherite. Syst. Min. Jamieson, p. 573.
Witherite. Emmerl. v. 1. 546. Werner.
Baryte carbonatée. Haüy, v. 2. 308.

This fine specimen came from T. Hall, Esq.
Lead mine, in Arkendale, near Richmond, Yorks

It was first found at Anglesark in Lancashire, but since in other places.

Carbonate of Barytes was first discovered by Dr. Withering (see Phil. Trans. 1784, 301.), when it was called aerated Barytes; but M. Werner wishing to honor Dr. Withering named it Witherite. It has since very properly been called Carbonate of Barytes. Radiating carbonate of Barytes in its weight and appearance very much resembles carbonate of Strontia: however it differs from it never being of a greenish colour, and in having its sachs larger, more compact and flatter. The upper figure represents carbonate of Barytes in dodecahedral crystals, formed of two hexahedral pyramids joined base to base, some quartz. These are the largest I ever saw and are rare at present. They are covered with a light ochraceous substance, perhaps calamine. The Matrix is carbonate of Barytes, in part decomposed and of a chalky appearance. The figures below show the geometrical plan, and in what manner one of the solid angles of the base has been mistaken for part of an octahedron, or has given the idea of two 4-sided pyramids joined base to base, which may have been described as one of its forms of crystallization.



*Carbonate of Barites in Quartziform or Dodecaedral
Crystals. Yorkshire?*

Ferrum Scheelatum.

Scheelite of Iron, or Wolfram.

Syn. Wolfram. De Lisle, t. ii. 311. and iii. 262.

Scheelin ferruginé. Haüy.

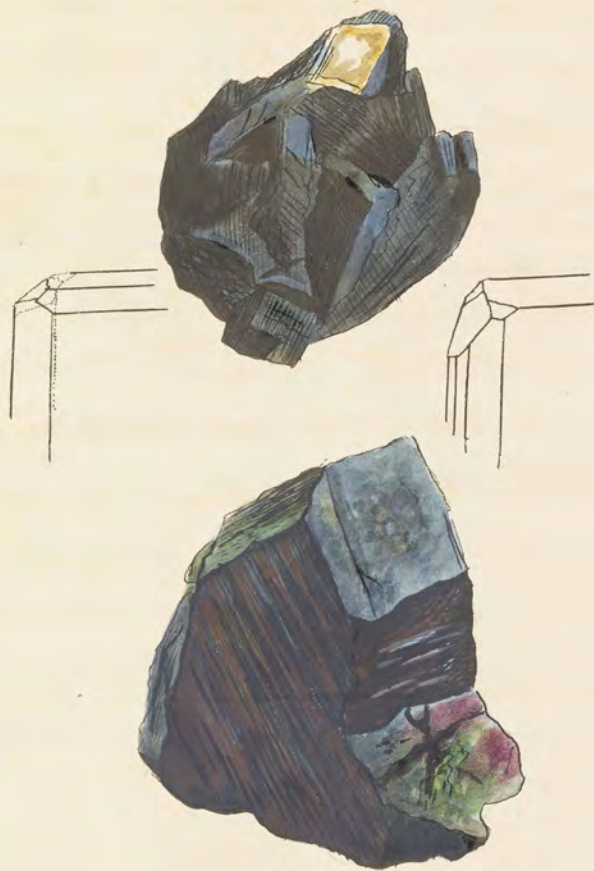
This substance had long retained the German name of Wolfram, although mineralogists were much divided about what class to refer it to, until Scheele had discovered Tungsten. It is found in tolerable quantity in Cornwall, & other Tin-Countries, from the Isle of Man - which formerly produced Tin. Much Spathe Iron Ore has been found there, very much of the same nature and kind as that figured in tab. 68.

The present specimen on account of the crystallized parts is curious, the crystals being clear enough to allow them to be described, which is rare.

The primitive crystal is a cube which may be fractured parallel to one of its faces, commonly with great ease, & parallel to another with some difficulty; but in the direction of a third with much irregularity. The crystals on the upper specimen cannot be seen without a lens.

It is accordingly represented by an outline on the left hand of the plate to show its modification, and another more complicated on the right. By examining these it will be found that they modify principally on one side of the crystal, leaving the other sometimes unchanged. The right hand one is compound. than any of Häuy's crystals.

The lower specimen has part of a pyramidal face exposed, and the platy fracture is very distinct as well as the shining lustre of the surface. This somewhat resembles the specimen from the Isle of Man, and is the most usual form of large ones.



Scheelite of Iron, or Wolfram.

276

Stannum oxygenizatum.

Oxygenized Tin.

Class 3. Metals.

Ord. 1. Homogeneous.

Gen. 6. Tin.

Spec. 2. Oxygenized Tin.

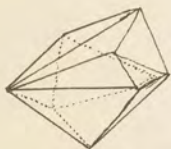
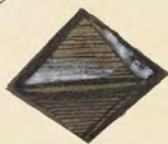
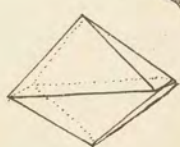
Dis. 1. Crystallized.

SPEC. CHAR. Combined with oxygen.

Octahedral crystals of oxygenized tin, destitute of any truncations, bevellings, or other modifications, have never yet been found; those represented are near-est that simple figure. This came from Cornwall. They are very black with much lustre, lying in every direction; some are smacked or transposed with various truncations, bevellings &c. The middle figure shows the most perfect octahedron Sowerby has seen. The edges of the pyramids are truncated more or less; the prism is perhaps shorter than here represented. The left-hand outline shows what it should be as a perfect octahedron. The angles of the base of the two pyramids are 90° .

Those of the face at the summit are $70^{\circ} 31' 44''$, and at the base $34^{\circ} 44' 8''$.

There have been two opinions concerning the primitive form of oxide of tin: the one that it is an octaëdron; and the other that it is a cube. We have obtained very neat fractures & parallel to four faces of the latter, and signs of faces inclined upon them; so as to form a rhomboidal dodecaëdron.



1-80

*Oxygenized Tin, with Modifications of the
Octaëdron.*



Exhibited at the
London Convention

The other specimen see tab. . is externally very much allied to a sandstone, although somewhat more condensed in the middle or centre; which often happens. The upper specimen is part of a piece found in Fleet Street in repairing the sewer there. It was very hard in the outward texture, and is quite solid within, losing the appearance of wood, having the hardness and fracture of Flint, with a colour like that of wood. It is stained black in some places, appearing like burnt wood. In this specimen it can be hardly seen whether it had been scorched or blackened by artificial fire, (as is sometimes done to give it durability,) or by a natural process, more gentle. The piece found below came from Derbyshire, it is nearly black all over excepting the outside, where it seems the bark may have covered it. This blackness gives it the appearance of having been charred by fire; but fire in the usual way must have affected the outside by stains or smoke &c.: this therefore is an extraordinary appearance, and difficult to be accounted for with certainty.

It is however to be seen, in some specimens, that the charring process may be effected by the natural progress or decomposition, which is continually seen to take place as far as our limits extend, and all over the surface of the globe. The Silica in this specimen, by attempting to crystallize has rendered it somewhat granular, and has in some measure destroyed the finer and more delicate parts of the Wood. It cannot be determined what kind of Woods these are. In coal-countries, and sometimes in other places, the Carbon and Bitumen often pass into coal, or new combinations under the influence of their particular situations.



Wood-like Quartz, or Petrified Wood.

284

Siles Analcimius, var. compactus.

Compact Analcime.

Class 2. Earths.

Ord. 1. Homogeneous.

Gen. 4. *Siles.*

Spec. 8. *Analcime.*

Div. 3. Amorphous.

Syn. *Analcime.* Haüy, v. 3. 180.

This curious substance is not uncommon in Great Britain, wherever basalt, and trap are found. We have some specimens from different parts of Scotland, which contain it in nodules. This specimen came from the Isle of Skye, and is somewhat stactolitic, and extremely various in its shapes, sometimes forming roundish drops from the size of a pin's head to that of a large pea, and often of a smooth elongated figure like a potatoe. It seems to be a transition from quartz, and decomposes into filaments forming zeolite. This specimen exhibits it beginning to form filaments. The bottom of the larger mass, which somewhat resembles the humerus, or thigh bone of an animal, appears once to have been in a thick fluid state, and might have

give some idea of the forming of the flints in cherty rocks
 (see page 254) ^{vol. 1} None of this is mentioned in another
 place. They may be found somewhat various in
 their colours. The most common are nearly as here
 represented; transparent white or glassy, and often
 pearly or greyish within; the outside being coated
 with a light brown crust often nearly opaque, which
 gives an idea of fresh cast ware. The fracture is ir-
 regular, glassy or flinty. Amalcime may be found
 in most of these appearances so hard as to resist a
 knife, like quartz; but in the state of compact Leobite
 or passing into fibrous, it may be scratched with a
 knife or any steel instrument, though it resists Iron
 or brass.

We are not sure that this is the true
 hyalite of Kirwan; who says it does not fuse per se
 at 150° . Ours fuses per se at the heat which turns
 carnelian white, which Kirw. observes was 160° .



Hyalite in Trap, Scotland.

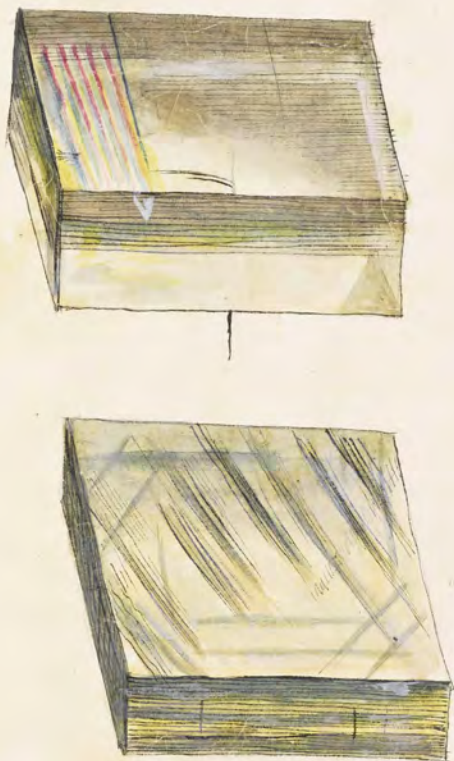
288

[Faint, illegible handwriting, likely bleed-through from the reverse side of the page.]

The upper fragment is in the form of the nucleus, or an upright parallelopiped; and as the faces are the same with the primitive, it is placed with the upright faces on a line, to show the refraction is not double in that direction: & it is to be observed that it requires a large depth of crystal to see the refraction though the other faces without the assistance of a lens. The flaws show the prismatic tints like other laminated crystals; This shows the depth of the flaw, and it is so sufficiently elastic that we can, by pressure, dilate the prismatic lines, so that 1 or 2 sets may take place of the 5 sets represented.

This came from Durham - but did not know of the value till lately - having discovered that it contains many small drops of Water, or other liquid in little hollows, which as far as we know have never been discovered in any other substance except quartz, or rock crystal.

The lower one is another fragment with a curious pearly appearance, and has somewhat the appearance of sulphate of lime or gyps, but may be readily discovered by the weight.



Fragments of Sulphate of Barites.

These specimens are from Salisbury Craigs, Edinburgh, and show the conical wheel-like formation nearly in perfection, but very small. Sowerby has greatly magnified the right-hand outline, which shows a narrow primitive edge, bounded by two lines. A similar crystallization is found at Kings park Edin^g.

The lower sort came from Frisky Hall, near the banks of the Clyde, about three miles from Glasgow; and also from Stothur's seat Edin^g. It shows a broad primitive face on the edge of the crystals, bounded by two acute ridges, which are bladed very confusedly on the specimens. The Wth Hon^{ble} C. Gneville has in his collection a specimen from Dauphiné with crystals, not much unlike the magnified left-hand bottom figure, in size & colour.



Crystallized Pohnite a variety.

296

*Barytes sulphata, var. primitiva.**Sulphate of Barytes.*

Class 2. Earths. Ord. 1. Homogeneous.

Gen. 6. Barytes. Spec. 2. Sulphates.

SPEC. CHAR. Combined with sulphuric acid.

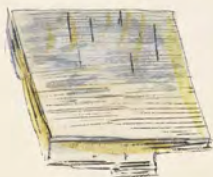
SYN. Boroselemite. Kars. v. 1. 136.

Schwer-Spath. Emmerl. v. 1. 550.

Baryte sulphatée. Haüy, v. 2. 295.

Naturn cristatum. Linn. Syst. Nat. v. 3. 90.

Ponderous Spar, as this was commonly called in England, agrees with the Greek term βαρυς, heavy. The uncommon weight of this substance in comparison to that of other stones gives it that name. frequent in or near Lead mines in Derbyshire, Cumberland, &c. — When transparent, it is generally crystallized and separable into laminae, much resembling carbonate of lime, and gives a double refraction through the rectangular faces only, but somewhat weaker than that of carbonate of lime. This is a curious circumstance, & perhaps has not yet been noticed. It may lead to the true nature of double refraction. Haüy had recourse to the ingenious method of forming artificial jaws to discover this property. This specimen is an Iron Ore from Lancashire, and is as near the primitive as is generally seen in Great Britain.



1-70

*Primitive Crystallized Sulphate of Barytes, &c, formed on
a variety of Hematite Iron from Lancashire.*

300

*Argilla durissima.**Scotch Corundum.*

Class 2. Earths.

Order 1. Homogeneous.

Gen. 2. Argil.

Spec. 8. Corundums.

Gen. Char. Lustrous to the touch. Easily diffusible in Water. Adheres to the tongue. Spec. Grav. 2. Kius. combines difficultly with acids, forming with most of them deliquescent salts, soluble in borac. Rab.

Spec. Char. Nearly pure argil, hardest of all minerals except the Diamond. Divisible parallel to a rhomb, the angles of which are $86^{\circ} 26'$ $93^{\circ} 34'$.

This curious substance, came from Achen-door sent by a dealer at Aberdeen under the name of Red Schorle, it appears to be new to British writers. Pomeroy says it is not to be found in any mineralogical collection in London. It occurs in long columns or bars from an eighth of an inch to $\frac{3}{4}$ thick, mostly confused, often diverging & with transverse flaws, having the matrix intervening abruptly. Its fractures are longitudinal and splintery. The columns are 4-sided, with saw replacing the edges in the centre of the angles: on one two or more sides the ends approach towards a pyramid with 4 rhomboidal faces. Among a tolerable quantity few were found with crystallized terminations, as figured the faces however are very distinct.

We find this fossil has been taken for a rutellite, and
 Kirwan's description in a great measure accords with that idea.
 see Kirw. v. 1. 288. Sometimes confounded with the bitumens
 of Kirw. May the radiating variety be the substance of which
 Macquest says the garnets are formed? He describes it as
 consisting of straight fibres diverging from a common cen-
 tre. See Kirw. v. 1. 261. Its common appearance resembles
 garnet much, but it is not fusible by the blow pipe, whereas
 garnet is fusible into a black enamel.

Kirwan mentions red. Schorls, p. 271, rutellites he says are
 also so called. another substance resembling this, according
 to the short description of Kirw. was found by Morveau in
 Poitou, v. 1336, which he presumed to be adamantine
 spar. Again as Haüy observes, another mentioned by
 M. Morveau, found in Le Forez, resembles it greatly,
 and very hard. Kirw 337.

Hardness shows nearly the same as that of spinelle.
 Soand the harder spinelles would scratch it; but the soft-
 er scratched by it. This seems undoubtedly the "spath
 adamantin d'un rouge violet" of Bouvignon he described
 in the year 1789 from specimens found in Le Forez.
 (Journal de Physique 453.) and now considers as a
 variety of corundum. Other authors have had a
 similar idea. We here subjoin a part of his descrip-
 tion: see Phil. Trans. for 1802, 323. where quoting Haüy,
 v. 4. 562. who observes "that it scratches quartz; that
 its specific gravity is 3.165, and that it is infusible

by means of the blowpipe;" Bouillon observes, "that it is
 red with a purplish tinge { some of our also are of a greenish
 tinge especially when between the eye and light. } that the
 appearance of the substance was entirely different from
 that of felspar; and that where it came in contact with
 the felspar it seemed to mix itself with it in such an
 insensible manner, that after having sawed and polished
 a piece of compound partly of felspar & partly of this sub-
 stance, it could not be seen where one began or the other
 ended. Ours is readily distinguished from felspar,
 which it imitates occasionally so that it is formed round
 it like a tube, see the middle figure at the bottom:
 it is also often running among it in the directions
 of the fragments, often passing abruptly across it.

The nearest approach to mixing insensibly is by
 fibres, which in ours are however sufficiently distinct.
 The Count continues to observe, "that the pieces he had
 collected varied considerably in their degree of hardness,
 although all of them were harder than felspar
 usually is, for many of these pieces would scarcely
 scratch felspar; whereas others could scarcely be
 scratched by the greatest number of gems, or precious
 stones. The characters of the last mentioned or hardest
 pieces appeared to be very similar to those of the
 imperfect corundum from China, a crystal of which
 M. de Lisle had sent him a short time before.
 The above observations, joined to the remarkable

manner in which this substance was mixed with the felspar made him adopt the erroneous opinion mentioned by the able Haüy in his observations upon corundum; namely, that this substance might be nothing more than a dense variety of felspar. He soon quite gave up the idea, when he examined the corundum."

Upon comparing the mechanical divisions of the corundum of Ceylon with the Scotch one, we find that it is not only parallel to the 6 faces of the rhomb, as described both by Bournon & Haüy, but also parallel to 8 other faces all mentioned in Haüy's description of his felspathic pyre, 2 are mentioned by him in his *Télasie*, & other 6 not mentioned any where as existing in the corundum of Ceylon, but wh^{ch} we find in some of our specimens. These faces are not so neat, or so easily obtained as those parallel to the rhomb. The gangue is chiefly composed of a coarse granite intermixed with indurated asbestos.

M^r Jamieson mentions the corundum of Sicily; which differs from this, & he quotes M^r Greville's memoirs in *Trans. of Royal Society*, for 1798, 40, who observes that it scratches glass readily, but not rock crystal. Jamieson says "I believe there are specimens of this corundum in the museum of the University, and of these I shall probably communicate an account in the close of this volume." but as he says no more about ^{the} hope it will be settled in his new work. We presume this is no more thought of as a corundum, as C. Bournon in *Phil. Trans.* 1802 makes no mention of it as such: therefore ours is the only thing known at present as a corundum from Scotland.



1-69

Red Schorle. Scotland.

306

Tab. 178.

This came from Hartfield near Paidey. a fine specimen showing the green side of the radii, and the crystals in nearly regular 4-sided columns, with 2 opposite truncations at the apex; these truncations, or secondary faces, are the same as those in another description, tab 153. on the upper edges, and ought to be particularly remembered, as they assist in forming a very singular modification, which is shown in tab. 158.



Crystallized Prehnite a variety.

3/0

Sterrum sulphurum.

Iron Pyrites in petrified Wood.

The upper specimen seems to have been part of a cylindrical piece of wood, and was found 260 feet below the surface of the earth in digging a well in Richmond Park in 1804. It appears to have had worm-holes, or holes of *Terebella*, perforating it in various directions, which may be presumed to have happened before the process of petrification had taken place. This may more properly be called Pyritaceous Wood, as the Pyrites or Sulphuret of Iron has filled the pores of the Wood so perfectly, that the shape & somewhat of the texture of wood was seen, such as if formed of pyrites. The worm holes some lined with pyrites and others doubly lined. One side being nearly covered with Pyrites makes it a beautiful specimen, as well as an instructive one. The lower piece was perhaps of different Wood, appearing like part of a plank. This was found 100 feet deep in digging a well for Mr. Truman's brewhouse, Spital-fields London. The worm holes are lined like the other, but they seem to have been a particular species which

prefer a straight direction, crossing the fibres of the
 wood. It is somewhat remarkable that the
 woody nature remains, and being found damp
 and fully saturated with the pyrites, it cracked and
 contracted from it, and is held together in some parts
 as if artificially done with wires, and is in some
 parts curved and warped. Thus although these pieces
 of wood seem to have been many years under this
 process, they are not much changed, but rather pre-
 served, as, now it is exposed to the common air,
 those changes which show its nature become evident,
 It will soon fall to decay, in the same manner
 as some part has already done. The Iron and
 Sulphur decomposing the water of the atmosphere,
 the Sulphur becoming acidified dissolves the Iron,
 forming green vitriol or Sulphate of Iron which
 is very deliquescent.



Pyritaceous Wood.

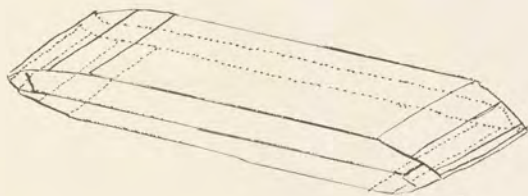
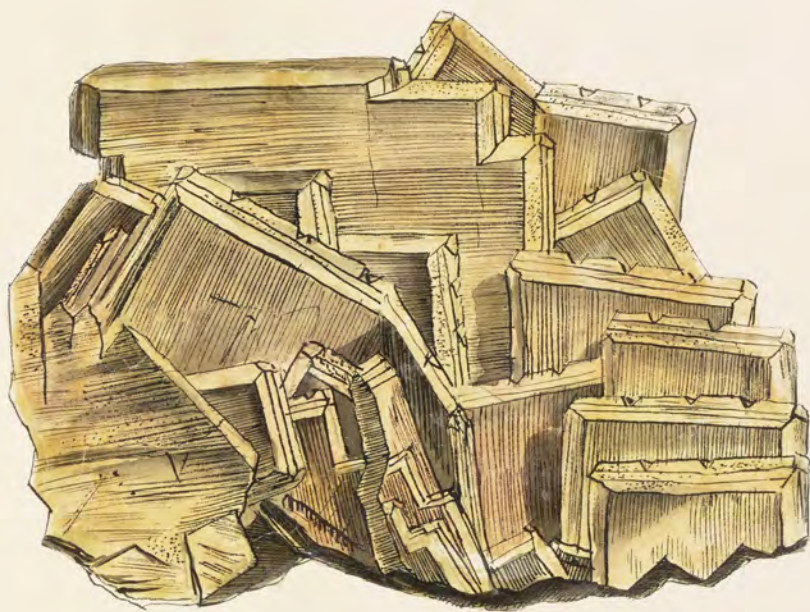
3/4

11
3
10
2
11

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Tabular sulphate of barytes is the most common variety. The finest specimens generally come from Cumberland.

The tabular crystals are sometimes transparent, & often more or less stained with ochre; they mostly stand upon their edges often very distinct & in every direction. It may be observed that their edges are parallel to the diagonal of the nucleus, therefore it becomes rectangular. The present specimen has small corner facets, parallel to the faces of the primitive or nucleus. One end has bevelled faces on either side, the angles measuring about 128° , which are parallel to the small triangular facets on the lower figure of Tab. 176. The other has three bevellings. See the geometrical figures.



1-72

Tabular Crystallized Sulphate of Barytes with 22 Facets.

Ferrium sulphureum.

Sulphur of Iron; Iron Pyrites

Class 3. Metals.

Ord. 1. Homogeneous.

Gen. 6. Iron.

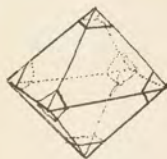
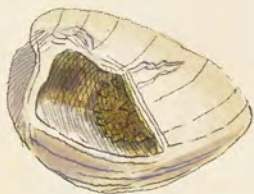
Spec. 6. Sulphuret.

Div. 1. Crystallized. Var. Octaëdral, &c.

Syn. Tersulfur octaëdre. Haüy, v. 4. 69.

Octaëdral pyrites is not so common as cubical pyrites; we have it however along with various substances, as calcareous spar, limestone, coal, &c. The present figures are designed to show this modification from the cube passing into what Haüy calls cubo-octaëdre, thence into the perfect octaëdron. At the commencement of this change the corners of the cube are replaced by triangular faces - see the left hand figure - which as the modification goes on, becomes planes of six sides each - see the middle figure - and at last the primitive faces are lost. These six-sided planes are reduced again to triangular ones, forming the octaëdron. The upper & right hand specimens came from Bath. The first is the cast of a shell of the *Trochus* genus; and it should seem that the crystals are on the cast

in place of a shell, as the rock is about the thickness of the shell from the east, and is a mould of the outside of the shell. On the left hand side remains a bit of the rock, and on the right hand we exhibited the thickness and calcareous remains of the shells, sufficient to indicate the species to a conchologist, which appears to be different from any shells of the present age. This came from Bath. The pyrites on this are octahedrons, some of the solid angles slightly truncated. It much resembles *Trochus niloticus* Linn., but we do not think it is of that species. The east of the shell on the right hand, of a golden hue covered with pyrites, generally deeply truncated, seems a species of the *Mytilus* cut off in the manner of *Donax denticulata* Linn. The shell on the left hand seems to be a *Tellina*, includes pyrites, chiefly cubo-octahedral - see left hand bottom fig. - as if hermetically sealed in, & not found till the shell was broken. This shell resembles Lister's *Tellina lata rugosa*, tab. 390. p. 229. These fossils are found in quantities at Woodwich & Carlton, 9 feet from the surface of the hill, in a loose marly stratum from 1 to 6 feet thick. Soon decay when exposed to the air. The other sort of shells are two species of *Turbo*. Of *Oyster* shells there is great plenty, these do not decay so soon as the others. There are other shells in this curious place.



1-99

*Sulphuret of Iron, crystallized in cubic-octahedrons,
Bath, &c.*

Barytes carbonata.
 Crystallized Carbonate of Barytes.

Class 2. Earths.

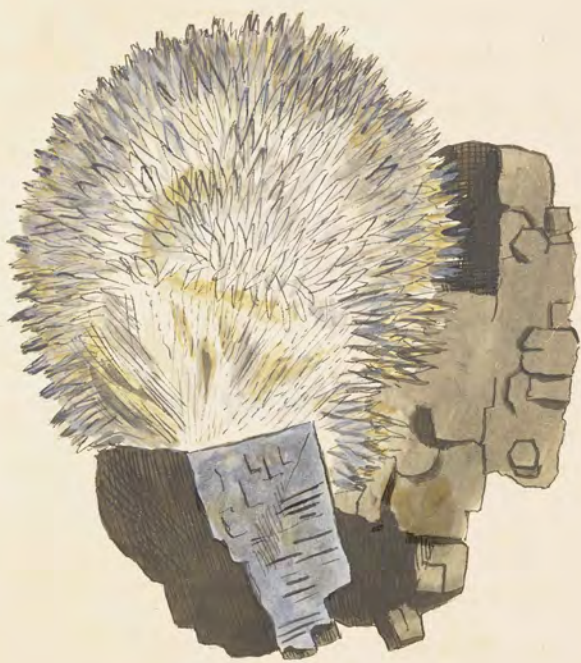
Order 1. Homogeneous.

Gen. 6. Barytes.

Spec. 2. Carbonata.

This specimen came from Mr. Halls mine in Aken-
 -dale; and as it is the first time that it has been no-
 -ticed with elongated spiculae so distinctly seen on he-
 -cidual pyramids, I am pleased at the opportunity of col-
 -lecting a figure of them. They are on a gangue of Galena
 of Sulphuret of Lead, forming an irregular sphere,
 echinated as it were, with spiculae: see the upper fig-
 -ure.

The lower figure on the right hand is a
 group of the spiculated crystals: on the left hand is
 a geometrical outline distinguishing the facets, three
 of which are continued to the apex, alternating then
 last are scarcely to be seen, and the spiculae seem
 to have only three sides.



*Carbonate of Barytes crystallized in determinate
hexaided Spiculae.*

326

Wednesday 11th May

Dear Mother
I received your letter of the 10th inst. and was
glad to hear from you. I am well and hope
these few lines will find you the same. I
am not at present very busy but I shall
try to write you more often. I have not
heard from you for some time and I
wonder how you are getting on. I hope
you are well and happy. I shall be
glad to hear from you soon. I am
your affectionate son
John Smith

*Ferrum arseniatum.**Arseniate of Iron.*

Class 3. Metals.

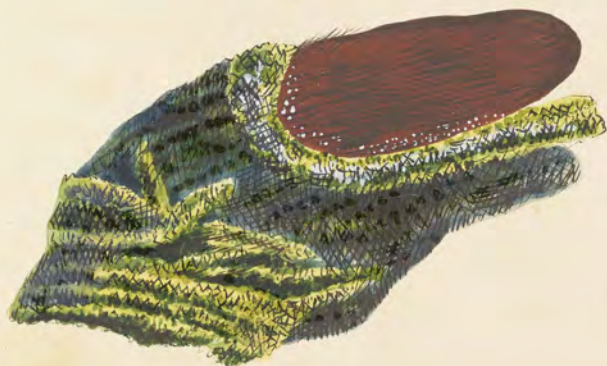
Order 1. Heterogeneous.

Gen. 6. Iron.

Spec. 8. Arseniate.

Div. 1. Crystallized. Var. 7. Primitive.

This arseniate of Iron is one of the richest that has been seen hitherto; and what adds most to the beauty of the specimen is, that the lighter green cubes are accumulated in groups, forming threads, lying on darker ones, all of which are very pellucid. To add to the rarity of this specimen we find extremely fine fibres of an oxide of iron? partly encircled by a band as it were of the arseniate, which relieves the reddish brown dusty appearance of the oxide; and this last, in return, relieves the glittering arseniate. The fibres of the oxide are so fine that it requires a high magnifier to see them; we could not discover any other than simple fibres. The top figure is of the natural size; the middle one, somewhat magnified; the lower are more magnified. The gangue is chiefly quartz, with various coloured ochres and some ironical iron, or what has been called mispickel: see the metallic parts in the upper figure. This is in Mr. Parkley's collection.



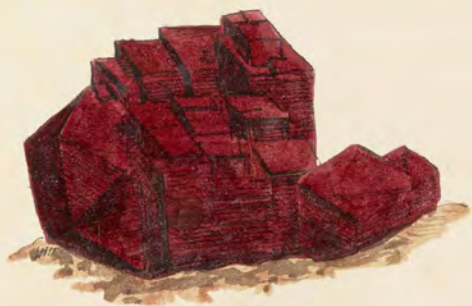
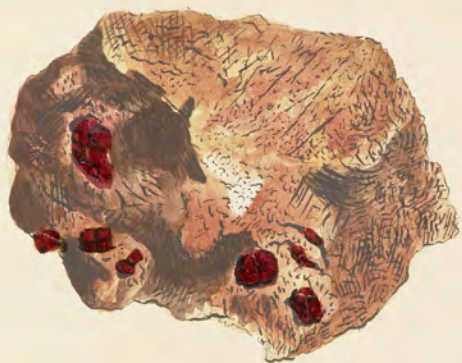
Arseniate of Iron. Cornwall.

330

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*Cuprum oxygenizatum; var. cubicum.**Cubical Red Oxide of Copper.**Syn. Cuivre oxyde rouge cubique. Haüy, v. 3. 557.*

Good cubical crystallizations of Red oxide of Copper are much rarer than octahedrons: see tab. 68. This specimen came from Bedouin in Cornwall. It is crystallized in distinct cubes sometimes, but oftener in rather irregular groups, yet with their edges and planes parallel to each other, seldom like flint, tab. . or Galena tab. . &c. which are generally more confused. It rarely forms large cubes, although I understand that some have been found 4 inch in diameter. They are often truncated at their solid angles, forming the cuboctahedron of Haüy, tab. 68: and 71. The magnified figure represents a group somewhat like one on the specimen, which has a large cubo-octahedron at the left hand corner, and the rest consists of various sized cubes, and one or two of another group, showing that the different groups may stand in different directions. These are more generally of a more beautiful Bohemian or Scotch garnet { Now called Pyrope differing from the common garnet in colour transparency, and in never being crystallized. It should seem also that they may be still further subdivided } colour than the octahedrons. We know of no difference in their substances.



1-100

Ruby Copper in Cubical Crystals. Cornwall.

Barytes sulphata.

Sulphate of Barytes.

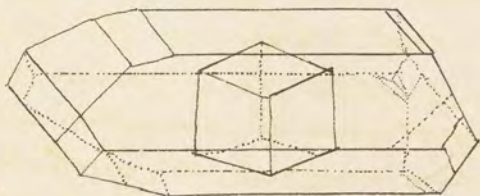
Class 2. Earths. Order 1. Homogeneous.

Gen. 6. Barytes. Spec. Sulphate.

Div. 1. Crystallized.

The specimen from which this figure was taken, in the collection of M^r Professor Hailstone at Cambridge, to whom it was presented by John Probst Esq^r of Copthorne near Shrewsbury, in whose interesting museum the professor saw several other crystals of the same kind, but of larger dimensions, and understood that they were found in same part of Shropshire; but he had no opportunity of ascertaining, any further particulars respecting their native beds, and situation in the earth. It is a valuable specimen, to show the nature of a crystal terminated on all sides, and independent, or not fixed on any gangue. This is not common to Sulphate of Barytes. It has only a few quartz crystals at the upper corner, as expressed in the figure. The modification is altogether singular, and is a variety not figured. We find it has 23 faces, some scarcely distinct. The crystal is lengthened parallel to the obtuse angles of the rhomb, and the upper primitive face, which shows the prismatic lines somewhat below the surface. It has little hollows as it were unsupplied by molecules; this is the case also

in other parts, giving the crystal a rough appearance. These hollows agree very well, when narrowly examined, with the shape of the nucleus. The general form will be better understood by examining the geometrical figure at the bottom containing a figure of the primitive or rhomboidal prism. See tab. ; allowing for the perspective, and conceiving the sharp angles as the obtuse ones, viz. the right and left hand angles, the upper and lower faces and the 4 corners are primitive faces, corresponding with the 6 faces of the nucleus. The four larger octangular faces are evidently parallel to the acute corners of the rhomb (allowing for the perspective). In their formation, the laminae are as if were arranged on the upper and under primitive faces, decreasing from the 4 acute angles of the nucleus from 4 obtuse angles; the same also forming 2 long quadrangular faces at the left hand end, and 2 large hexangular ones at the other end of the geometrical figure coming in contact with the primitive faces at the corners, at an angle of about 123° with the upper or under primitive faces. Next to these on the same angle of the nucleus, are 2 other 4-sided faces above & below, the larger at an angle of $140^\circ 59' 2''$ upon the primitive, and the smaller at one of $162^\circ 2' 44''$. These may be distinctly seen ^{on} the top of the upper figure. The Cumberland specimens seem to have the face of 123° , which appears not to have been seen by Haüy. Mr. Haüy's specimen has two small faces marked by dotted lines on the right hand front corner, and one on the right hand corner at the back, which agree with the faces of Haüy. This form has not been seen in any other English specimen.



1-98

Crystallized Sulphate of Barium. Shropshire.

1801

THE HISTORY OF THE

REIGN OF

GEORGE THE THIRD

BY

JOHN BAKER

OF THE MIDDLE TEMPLE, ESQ.

IN TWO VOLUMES.

LONDON, Printed by J. B. & C. 1790.

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*Ferrum sulphureum; var.**Hair-like Pyrites, or Sulphuret of Iron.*

Class 3. Metals.	Order 1. Homogeneous.
Gen. 8. Iron.	Spec. 5. Sulphuret.
Div. 2. Imitative.	

This beautiful specimen was found many years ago in the magnificent Lime Quarries of L^d Elgin, at Kroom-hall in Sheshire, and is the only one of the kind which has been discovered.

The appearance of so many radiating, straight bristle-like forms has a remarkable effect, and is very striking. Although they are extremely attenuated, they seem to be square, and are probably elongated octahedrons. Their passing through and among the pearl-spar {see tab. 42.} so uninterruptedly is worthy of notice, and will give us reason to believe that both substances settled from their solvents at the same time, or nearly so, without disturbing each other. They are both upon shelly grayish Lime Stone. It is with much pleasure that I introduce this as a British specimen as it is not at all generally known to be found any where but at Joachimsthal in Bohemia, and even there very seldom.



Hair-like Pyrites, or Sulphuret of Iron.

344

Tab. 187.

*Manganese oxygencatum.**Oxide of Manganese.*

Class 3. Metals. Order 1. Homogeneous.
 Gen. 5. Manganese. Spec. 2. Oxide of.
 Div. 3. Amorphous.

In tab. . of this work we have figured a rare specimen of Oxide of Manganese in columnar crystals. The present amorphous specimen is curious on account of the variety which it exhibits. It is supposed to be mostly Oxide of Manganese in different states, white brown and black; and the manner of its mixture adds to its beauty. This specimen came from Devonshire. Sowerby has specimens of Red Manganese from the same place, where there is a great variety. Besides Oxide of Manganese this specimen contains in the whiter parts a tolerable proportion of Carbonate of Lime, which in some is crystallized like Pearl Spar; tab. 42.



Oxide of Manganese.

Silex Quartzeum; Var. opalinum.
Opal.

Class 2. Earths. Ord. 1. Homogeneous.
Gen. 4. Silex. Spec. 1. Dudaite.
Div. 3. Amorphous.

Syn. Quartz resinite opalin. Haüy, 2. 434.
Opale. De Lisle, 2. 145. De Born, 1. 81.
Edler Opal. Emmerl. 1. 277.
Calcedoine irisée, Opale. Duda. 3.
Halt-opal. Werner.

We cannot boast of very beautiful Opals in England. The variety of this gem makes it worthy of notice, and the present specimen shows it passing from Chalcedony to Silex, and from Silex to Hydrophanous Opal, or what was seen called Oculus mundi. Lastly it forms the semi-opal or common Opal. The ~~last~~ chalcedony is hardly to be distinguished in a drawing, it is the darker part mixed with copper pyrites in the figure. The name Silex applies to the opaque whiter and softer part, which may be scraped with the finger nail, and will like all agates and chalcedony, become more transparent in water. Hydrophanous Opal is the less opaque part of a greenish hue, and in water becomes like the opal or bluish green part. In this state it resists the finger nail, and, while

in Water, is not to be distinguished from the Opal, but becomes opaque again when dry. Common Opal is nearly the same in appearance, either wet or dry, and comprises the grayish, bluish, greenish, and yellowish parts with a milky or waxy centre, (like the Semi- or Halb-Opal of Werner,) with a vitrescent effulgence or yellowish fiery glare; in some lights, especially in the flaws. Fracture glassy. Hardness sufficient to cut glass. The most beautiful specimen ever discovered of this substance is in the possession of J. M. Cripps, Esq^r. of Lewes, in Sussex. It came from Constantinople. but was found at *Op-
-prica*. Unlike the common specimens, in which Opaline wood appears in small veins intersecting the common *Tropil Wood*, or in a fragile state like pitch stone, it has throughout the whiteness of lacholong & in some parts the lustre and colour of the genuine Opal. It is larger than a Mans body & weighs 148^{lb}. 9^{oz}. 9^{gr}. It presents half the trunk of a large Bee, with the node of one of the principal branches. The timber the bark, & every part of the mass is perfectly opaline. The R^h Hon^{ble} Sir J. Banks had a Mammoth's grinder, lately found on our coast, opalised. Sowerby saw a Mammoth's tooth from America somewhat opalised. in the late M^r. John Hunter's museum. There are some also in the British Museum. Sir Hans Sloane gave 200, for an *Oculus mundi* now in the British Museum.



Opaline Calcedony. Cornwall.

Cuprum sulphuratum.

Sulphuret of Copper

Class 3. Metals.

Order 1. Homogeneous.

Gen. 10. Copper.

Spec. 4. Sulphuret of Copper.

Div. 1. Crystallized.

Syn. Yellow Copper Ore.

Min. v. 2. 140.

Copper pyrites.

Syst. Min. Jameson.

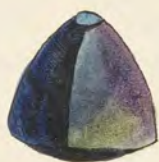
Kupfer-kies. Emmerl. v. 2. 232. Wimmer.

Cuivre pyriteux. Haüy, v. 3. 529.

This copper ore is not uncommon, but this form has not been spoken of by any mineralogical writer. Tetrahedrons have been mentioned, but not with pentahedral convex faces, which seems a character of this ore when crystallized, in tetrahedrons; most British specimens incline to convexity. These will tarnish, often assuming a coat, either like blue steel, or bluish black, and it often has the green, platinum, or oxide of copper, on the surface, mentioned by Count Bournon in his description of yellow copper; Phil. Trans. for 1801. When fresh broken it is of a bright greenish yellow colour with a metallic lustre, and the flaws tarnish to the various colours of what is commonly called Peacock Ore. The fracture is smoothish, having more or less of a fine-grained surface, sometimes like the finest sand. The crystals are brittle, & tender to strike fire with steel.

The left hand sides of the two figures show the inclination to form three trapezoidal faces on the triangular ones;

and the figure between two columns of quartz shows them more plainly, as it does also the signs of the triangular laminae of superposition. This is taken from another Cornish specimen. The geometrical figure shows the somewhat obtuse tetrahedron; each face of which is replaced by three rhombohedral ones making a dodecahedron. The nearest modification of this kind is in *Mon. de l'Isle*, tab. 1. fig. 28. but this has 12 additional isosceles triangular faces. Haiy has a crystal something like this in Sulphuret of Zinc, which he derives from the rhombohedral dodecahedron. See his fig. 197. The rounded tetrahedral crystals are therefore passing to the dodecahedron in an almost imperceptible manner as the three figures on the 2^d line show. This specimen has some more perfectly marked, and some truncated like the two left-hand figures.



*Sulphuret of Copper, with the Trapezoidal
Dodecaëdron and other Modifications.*

Calx Fluor, var.

Stuate of Lime, or Fluor.

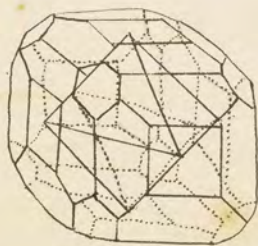
Class 2. Earths.	Order 1. Homogeneous.
Gen. 3. Lime.	Spec. 3. Stuate.

These specimens are among the rarest of the fluors known in Great Britain. It is an instructive specimen, having the form of a purple octaëdral nucleus within side, and the green modification in order about it, which adds to its beauty as well as rarity. One side of this octaëdron has many small but perfect cubico-octaëdrons (or cubes with the corners truncated) of pyrites. Sowerby has a specimen. It is somewhat rougher and rather chiller, standing on a confused octaëdron, the corners of which are rather prominent, forming, as it were, irregular steps; it includes a small octaëdron greener than the rest, but rather obscure, within which is a smaller purple one but which is not to be seen without turning the

Specimen about many ways. They both come from St. Agnes in Cornwall.

The Lower geometrical figure explains this modification complete, in a position to make it familiar, and to show the placing of the octaidron, which is in the position of the common structure of all fluates of lime. See Tab. 78. and the latter part of the corresponding description.

The upper middle 4-sided face in all the figures will be found to agree with the face of the cube common to fluates of lime: the 4 sides of which are levelled off, and the corners as before mentioned, are parallel to the faces of the octaidron, they forming six square faces of the cube, eight faces of the octaidron, and 24 levellings; in all 38 faces.



1-73

38-sided crystals of green fluor, containing a purple octahedral
Nucleus of the same substance; very rare. Cornwall.

Stannum oxygenizatum.

Oxide of Tin, in Crystals with 8-sided
Pyramids.

Main oxide opposite. Häuy, v. 4. 141.

This is a rare modification. It is an incomplete 8-sided pyramid placed upon a 4-sided prism, at an angle of 155° according to Romé de l'Isle, and of $158^\circ 45' 27''$ according to Häuy. This pyramid is always terminated by another 4-sided one parallel to the octaedron. They either stand on the gangue upright, with one end only finished pyramically, as appears from the middle figure on the right hand, which is a large and curious detached crystal: being, broken at the top, it gives an indication of a point, but on examination we find it cased on an octaedron, which probably it once covered regularly; or they lie on their sides and are pointed at both ends: see the left hand figure. Seldom large. The gangue is as usual to tin crystals, viz. rock crystal, chlorite, and chlorite schist, or millas of the Cornish miners. The geometrical outline on the left hand shows the commencement of the 8-sided pyramid on the edge of the prism. There are many varieties of this modification on this specimen, & sometimes two of them meet base to base, and form a machine: see the bottom figure.



Oxide of Tin in Crystals, with 8-sided Pyramids.



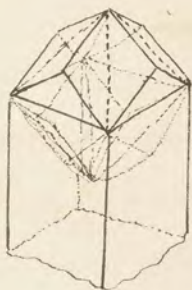
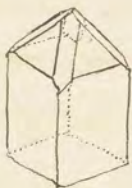
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1891

365

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The figures here represented approach ^{as near} the dodecaedron as any Sowerby has met with of British origin. It will be readily seen that the edges of the 4-sided pyramid, as truncated on the left hand figure, if continued so as to obliterate the octahedral faces, would form, with the help of the 4-sided column, eight of the faces of the dodecaedron, the other 4 faces being hid in the gangle, and, if with a short column, the faces would be all rhomboidal; but if the column be long, the columnar faces will be hexagonal. as yet we have not seen a dodecaedron with both pyramids complete. These specimens are not so black as most, and are modified very roughly. They have also somewhat of a rusty ochraceous hue, probably holding more oxidated iron than usual.



1-82

Oxide of Tin in Dodecahedrons, with Rhomboidal Faces.

Manganesium oxygenizatum, var.

Primitivum.

Oxide of Manganese.

Class 3. Metals. Ord. 1. Homogeneous.
Gen. 2. Manganese. Spec. 2. Oxide.
Div. 1. Crystallized. Var. 1. Crystal primitive.

Gen. Char. Spec. Grav. 6.85, somewhat malleable.
Colour grayish white, very difficult of fusion, even
more so than Iron. Colours glass violet. Does not
combine with Sulphur.

Spec. Char. Combined with oxygen.

Syn. Manganese mineralized by oxygen, Kirw. 2. 2. 291.

Gray manganese ore, Syst. Min. Jamison.

Braunstein. Zimmerl. v. 2. 522.

Manganese oxyde. Haüy, v. 4. 243.

Manganese { which was first discovered to be a new metal
by Bergman }, and which has since been found in
a native state by M. La Perouse, in the Valley of
Vicdessos, near Sem, in the neighbourhood of Foix,
Pyrenees, who says it is imbedded in oxide of man-
ganese; is of a Silver gray colour with a metallic
lustre;

divergently foliated texture, somewhat malleable, and that it soils the fingers. We describe with much pleasure the present specimen of crystallized oxide, as propitious to an expectation that Great Britain nearly includes all that is essential to a knowledge of mineralogy, very few genera excepted. Mines have been worked in many parts of Great Britain for oxide of manganese. Saworley has some specimens from Mendips Hills in Somersetshire, crystallized in small rhombohedral prisms. The one figured is crystallized in elongated ones, which have striae on their sides that agree with the fracture. The apex also show signs of a diedral or tetraedral summit.

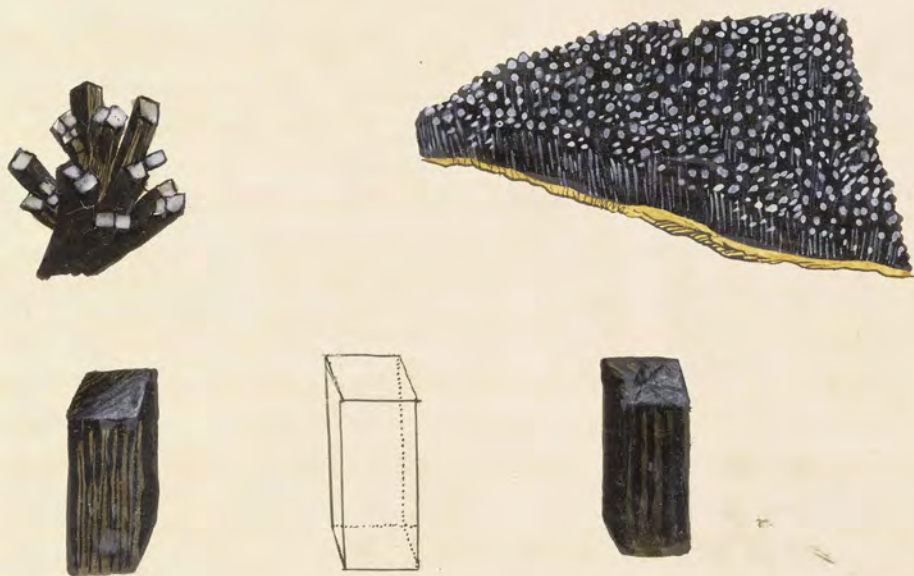
The upper right hand figure is nearly the natural appearance and size of the specimen; the prisms standing irregularly and joining near the base, where they stand upon sulphate of barytes, &c.

The gangue is a sort of stratified micaceous grit, through a stratum of which it runs in veins. In a map that came from Aberdeen, the manganese includes crystallized sulphate of barytes, &c. as trap sometimes does other stones.

The left-hand upper figure is magnified, and shows how irregularly the crystals stand on the mass in some parts. The left-hand bottom fig. shows the upright striae, and on some crystals a slight beginning of the two faces that sometimes meet on the centre. The lefthand figure shows these striae meeting in 4 directions to the centre, with the cross diagonals giving signs of 4 or more faces. The prism is sometimes truncated so as to form 8 sides. Having however of no other than these 8-sided ones, with 2 or 4 summits at the apex. We first read of short ~~truncated~~ tetraëdral prisms of oxide of manganese in Catal. de Raab. v. 2. 130, from Naila, in the margravate of Baireuth, in Germany, and soon after of rhomboidal tetraëdral prisms, neatly truncated at their extremities, from Ilmenau in Saxony. These of course are in M^r. Gueviller's matchless collection; we find the latter mentioned as from Ilfeld, in D^r. Babington's catalogue of the collection, now belonging to Sir John St. Aubin, p. 255. We are glad to be possessed of British specimens from the moor near Aberdeen, first discovered by the Rev^d. — Smith. The present specimen was procured in 1803. It agrees exactly with

the two last specimens mentioned in Cat. de Naab., in which the word *truncated* is certainly superfluous *rhomboidal prisms* simply, being aptly ment. This is considered as the primitive form by Haüy.

Oxide of manganese is used in glass-houses in small quantities, to clear and de-colour glass by giving up some of its oxygen, and so completing the vitrification of the Iron or other colouring ingredients. It is used as a pigment or an ingredient in printers ink, and to procure oxygen gas from, and for many purposes, viz. as a medicine; or for oxygenizing muriatic acid for bleaching, &c. about two quarts of this gas may be obtained from an ounce of oxide of manganese.



1-86

*Oxide of Manganese crystallized in
Rhomboidal Prisms.*



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Silex Quartzum.

Flint Pebbles, &c.

Class 2. *Synth.* Order 1. *Homogeneous.*

Gen. 14. *Silex.* Spec. 1. *Quartz.*

Dio. 3. *Amorphous.*

Syn. *Flint.* Kins. v. 1. 301.

Seuer *Stein.* *Emmerl.* v. 1. 143.

Quartz agathe pyromaque. *Flint,* v. 2. 427.

The forms and colours of flint pebbles are extremely various, & they give strong indications of being formed by infiltration and aggregation among the softer argillaceous rocks; as the agates, &c. seem to be among the harder rocks of a similar nature; see p. 203 vol. 1st the siliceous infiltration being more or less coloured by oxide of iron, gravitates, or aggregates, into various forms.

The upper pebble at the right hand is white at one end, gradually becoming grayer towards the other end, with a line or two of interruption, and at length assuming the texture & colour of common gray flint.

The uncoloured part

The common ingredients are *Silex* - 80
Argil - 18
Lime - 2
100

is sometimes less indurated, but insoluble in acid, and seems to be only destitute of the colouring matter. The coat appears to have been formed when the process was nearly complete, as drops of coloured water, or turpentine, will in general, form a margin in the same manner on substances on which they are put: the others seem formed in a similar way, varying as to regularity. An approach to yellow, with a border of ^{dull} dark crimson, is seen in the next stone, and the coat is nearly black with very little variety. The next right hand figure was found near Norwich. It is remarkable for the uniformity of the ochraceous tinge all through it, and the dark coat penetrating it in the cracks, which seems to confirm the



Variety of common Flint Pebbles.



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Ferrum arseniatum.

Arsenate of Iron.

Class 3. Metals.

Order 1. Homogeneous.

Gen. 6. Iron.

Spec. 8. Arseniate.

Div. 1. Crystallized. Var. Primitive.

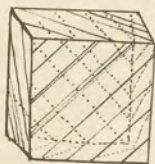
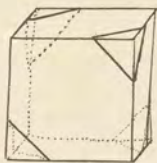
Spec. Char. Combined with arsenic acid.

Syn. Arseniate of Iron. Bournon Phil. Trans. 1801.

This was mostly confounded with arseniate of Copper until the celebrated Kenevia by ~~analysis~~ analysis, ascertained it to be an arseniate of Iron: see Phil. Trans. 1801. Count Bournon observes that it crystallizes in cubes rarely a little flattened: and rarely lengthened. I, however have it a little so perhaps the $\frac{1}{4}$ of its diameter; and his figure conveys that idea, perhaps unintentionally. The sides he observes are smooth and brilliant. They are diagonally striated in alternate order on each face; this is readily seen in most of my specimens. {see Ferrum sulphureum, tab. 168. in which the striae are parallel to the edges of the cube; and Count Bournon has discovered a new species of cubic oxide of Iron with the striae at right angles, parallel to every edge of the cube: perhaps these striae may become marks of importance} They are often a little concave in the centre,

and rising to the edges in the longitudinal direction of the striae, and also show signs of being formed on cubical nuclei. Sowerby has them from a light yellowish green to a bright green, apparently neither inclining to yellow or blue; passing on to deepish blue green, thence to an olive, being heightened with red; then the yellow and red predominating. They are of a brownish resin colour: some very transparent: all a little. The upper figure shows them of the natural size in a gangue of quartz mixed with oxides of copper and iron &c. The middle figure is magnified to show their construction more readily; and the right-hand geometrical figure shows the striae. In the left-hand bottom figure, the only modification known of this substance, according to Count Bournon. "4 of the 8 solid angles of the cube are replaced by an equal number of ~~symmetrical~~ equilateral triangular planes, situated in such a manner that every one of the sides of the cube becomes an elongated hexagon, having two angles of 90° each, and 4 of 135° . Crystals modified in this way are very scarce. Sowerby saw but one specimen, in the collection of Sir J. St. Austin. Its crystals are pretty large and well defined." Sowerby considers as a great rarity a specimen in his museum which exposes 2 crystals thus truncated. It is easily scratched with a pin, but it scratches common calcareous spar. By Wernicke's analysis it was found to contain

Silica	----	4
Arsenic acid	----	.31
Oxide of Iron	----	45.5
— of Copper	----	9
Water	----	10.5
		<u>100.5</u>



Arsenate of Iron crystallized in Cubes.

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Zincum sulphuratum.

Sulphuret of Zinc, Blend.

Class 3.. Metals

Order 1. Homogeneous.

Gen. Zinc.

Spec. Oxygenized.

Spec. Char. Zinc in combination with sulphur.

Syn. Zinc mineralized by sulphur with iron.

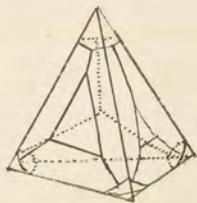
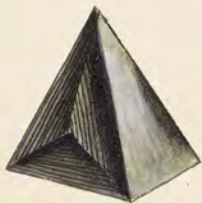
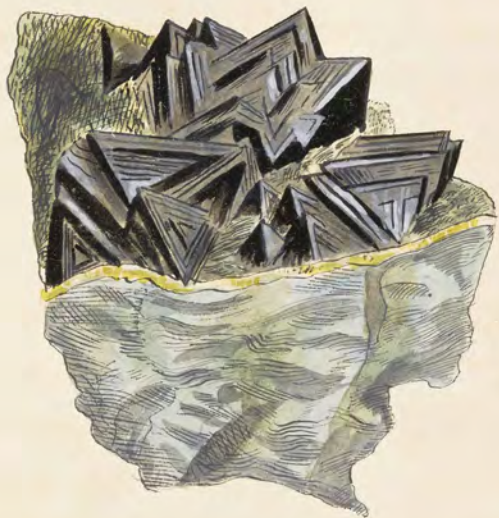
Wirtz. v. 1. 237.

Blende, Ennemont. v. 2. 443. Syst. Min. Jameson,
v. 1. 16.

Zinc sulphur. Haüy, v. 4. 167.

Blende (commonly called Black Jack by the miners) is often found crystallized, but generally in a very compact manner, and most frequently of a deep jet-black. The rhachidral variety, here figured, has something of a deep black luster, and approaches to a lead like appearance. Except one or two solitary crystals, they are generally in platy clusters or groups; the plates for the most part diminishing from the edges to the centre of the triangular faces, forming three faces, as on the dark side of the right-hand figure. Occasionally, each face of the rhachidron will differ; and one may either be seen plain, as at the base of the lowermost

geometrical figure, or have the above-mentioned three faces terminating in a point like the dotted faces on the distant side, or with another triangular face like the right or left hand sides of the same figure. The truncations of the four solid angles, in the left-hand and geometrical figures, are parallel to the octahedron. These modifications are all evident in the present specimen, which is a Cornish one. They rest on a greenish chlorite, on a light sort of schist or slaty rock, commonly called kyllas by the Cornish miners. They are often accompanied with rock crystals and copper pyrites. The nucleus is a rhomboidal dodecahedron, and the integrant molecule is a tetrahedron with isosceles triangular faces, according to Haüy. The modification called encadrée by that author, among the sulphurates of copper, resembles this very much; but he does not seem to have known such in sulphuret of zinc. Its specific gravity is 4.1665 according to Brisson. It may be scratched with a knife, and it will scratch sulphate of barytes, but not fluor. Refraction simple, Haüy



1-74

*Tetrahedral Blend or Subphuret of Zinc,
variously modified.*

Carbo oxygenizatus bituminosus.

Bituminous Oxide of Carbon, or Bovey Coal.

Class 1. Combustibles. Order 3. Mixed.

Syn. Bovey Coal. Hatchett in Phil. Trans. for 1804. 385.

Compact Carbonated Wood. Alms. 2. 61.

Bovey, in Devonshire, has been some time famous for affording a fossilized wood of a nature peculiar to the place, commonly called Bovey Coal. It appears that the main dip is from South to North. the upper rock end terminates like the remains of a Bog. The upper part contains stems and broken remains of Shrubs and Trees, little changed: a little way down they are somewhat ruinously bituminised; see tab. 199. & still appears like wood. touch greasy, will polish with the nail, being saturated or closed with bituminous matter. In places resinous Arbutum is intermixed see tab. 204. In other places look like common charcoal tab. 199. most perfect Bovey coal is found deep, being a compound of these two, less resin in the bitumen & the coal more indurated, forming a wood-like bituminous coal. There are 17 strata found in intermediate gradations: the lower most perfect, about 70 feet deep or more, where the various figures, and the state of confinement of the different strata, retard or accelerate the process. It seldom forms a large piece of better brand black, although the charcoal before mentioned is as black as common charcoal. often very dark coloured.

like part of the lowest fig. used as coal by the poor, near, and
 at a pottery, established on purpose to turn it to account. The
 smell is unpleasant. "It burns to charcoal" Hatchett says "eas-
 ily, with a flame, like half charred wood - not crackle; if quite
 burned leaves white ashes, like wood". probably it was originally
 formed by being a bog & at 17 different times, between each
 sufficient time for fresh wood & clay to collect. The strata left
 dense & looser than that under which Newcastle coal is
 formed. The resinous or bituminous parts have been
 more or less allowed to evaporate according to the pressure;
 at the surface but little, & scarcely at all at the bottom.
 and as it loses its most volatile principles, the more
 durable woody principle, or carbon, will last for ages.



Bituminous Oxide of Carbon, or Boney Coal.

Sulphur nativum.

Native Sulphur, or Brimstone.

Class 1. Combustibles. Ord. 1. Homogeneous.

Gen. 6. Sulphur. Spec. 1. Native.

Gen. Char. Solid. Colour pale yellow. Burns with a blue flame and pungent suffocating odour.

Spec. Char. Uncombined.

Syn. Native Sulphur. Kirw. 2. 69.

Soupe. Haüy, 3. 277.

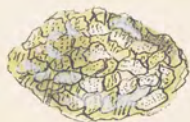
Natürlicher Schwefel. Emmert. 2. 89.

Pyrites nativus. Linn. ed. 13. n. 3. 113.

Bowerly has specimens of native Sulphur from Ambock, N. Wales. It is in an earthy-looking state, something like flowers of Sulphur. He does not know that it has yet been found crystallized in Great Britain, but thinks it possible may. The present is in a dull rusty state, but in some parts tolerably pure, and after being refined is cast into cones and sent up to London.

Upon a minute examination with a lens, it appears to be mixed with fine sand or granules of Quartz; see the lower figure.

It is rather curious to find that Sulphur with Iron, &c. is very common, and the odour of Sulphur is very strong in many places under ground fresh dug, particularly among decayed vegetables in summer, yet most authors speak of it as only found in the neighbourhood of volcanoes. This is not the case in Wales. Its colour is yellowish with some shade of green; it is found concrete or in loose powder; by friction emits a peculiar odour, and becomes electric; melts at 185° , and then appears red; its flame of a bright blue at 302° , emitting a sharp or pungent odour when it absorbs the pure air of the atmosphere, causing a stifling sensation, and becomes acidified, forming Sulphuric Acid; in close vessels it sublimes without much alteration.



Native Sulphur, or Brimstone.

After figuring the resinous Asphaltum. it is proper to show the nature of the wood, from the same spot, in its passage to what the people of the neighbourhood call plant, and Bovey coal.

The upper specimen is nearly in the state in which we find rotten wood sometimes above ground, even in parts of living trees; with an earthy fossil-like appearance. The grain and fracture of the wood still remain, with the fragments so sharp, that were it not for the colour and dull earthy appearance, it would seem but little altered: it is however, so soft as to rub away under the figure like Roman Ochre, or the brown inside of the bark of some old firs. It burns at first with a flame, then with much smoke and an odour like the Resinous Bitumen, retaining a spark for sometime, almost like Touchwood.

The lower specimen is nearly of the same nature as the above, with a more rotten appearance & so soft as to have been pierced with roots like an earth; which often also sometimes happens to the rotten parts of living trees. But what is very remarkable, the two broad specimens surfaces of this specimen exactly appear as if they had been burnt, so as to be a perfect charcoal; and neither these fibres nor

the inner part seem to have been scorched. { M^r. Hatchett
 in his Analysis of the Iceland Schistus & Bouey coal, Phil.
 Trans. for 1804, p. 399, found that the Alkaline principle
 was wanting, as I asserted to be the case in the wood-like
 bark of Newcastle coal. Brit. Min. tab. . But whether either
 of these specimens contains the principle I know not. }
 M^r. Hatchett remarks that "the half-charred appear-
 -ance of Bouey coal cannot be adduced as any
 proof that the original vegetable bodies have been
 exposed to the partial effects of subterraneous fire."
 Nature coincides greatly with M^r. Hatchett, and in the
 general acceptance of our idea of water, that it, has
 been the cause. We must remember that water is
 a very active agent, and is never quiet where there is
 the smallest room for its action; and as soon as the
 least fermentation is produced, calor or fire is evolved:
 and as this is continued from time to time, it is capa-
 -ble of producing the greatest effects. Thus the wood
 is formed into charcoal, slowly or otherwise, but ac-
 -tually by calor or fire, though water seems to be the
 principal agent. It is plain this is one of Nature's methods
 of combustion, as well as that this agent, often produces
 common fire, as in a Hay-stack, &c. yet a haystack
 may sometimes be in part so scorched as to be spoiled
 without the appearance of rapid fire by red heat or
 flame.



Resinous Bitumens.

398

Silix . Analcimeus, var. fibrosus.

*Fibrous . Analcime in
Trap.*

Class 2. Earths.

Order 1. Homogeneous.

Gen. 4. Silix.

Spec. 8. Analcime.

Syn. Zeolite. Hous. v. 1. 278.

Analcime radié. Haüy, v. 3. 182.

Zeolite, formerly so called, is often found in Trap, as if passing from opaque hyalite of Kinn (see Tab. 173.), at length leaving the spaces where it was first formed empty, and giving the stone the appearance of a scoria or basaltic lava. This is a new variety of basaltic trap, which has hyalite of a pebble-like appearance in one part. In some cavities it has partly fibrous zeolite; in others the zeolite appears in fine filaments, sometimes of a silky lustre, filling the holes like cotton or with loose threads, which are often scattered more or less in irregular bundles, somewhat radiating. The holboars which contain these are mostly lined with small crystals. These at first sight look like quartz, such as often sparkle in common flints but if examined with a glass their structure determines what they are. See Tab. 202. and magnified figure at the middle and bottom of this drawing. We use the old term of Zeolite, as being most familiar: at present it is synonymous with analcime.



Zedite in Trap Scotland.

402

*Silex talem, var. arenaceum.*Sandy Tale.

Syn. Mulatto Stone of the Irish.

This is abundant in the neighbourhood of Belfast, and found under a stratum of Limestone. It is harder than the last, being sufficiently incorporated and indurated to be termed a stone, thus differing from the other, although perhaps containing the same materials; viz. Sand and Lime, with possibly some, clay, besides Tale.

The upper figure came from Belfast, which has the impression of an oyster, without any remain of the shell, and that part which seemed to be the impression of the connecting cartilage of the oyster has the substance of carbonate of Lime. There are often no doubt curious shells found in this substance: The green Tale which spots this stone gives it the characteristic by which it is commonly recognised, and often other stones which have greenish substances

are confounded with it.

The lower specimen was sent with others, by Dr. Scott. All had more or less impressions on them, and mostly of the same animal or shell, something like a curved oyster; { Of these Sowerby has some curious small specimens, from Wingham in Kent, about ten miles from the Sea. There were no vestiges of Chlorite about them. } which is very common where sand & chlorite are found together.

The formation of these rocks or sandy marbles &c. seems to be nearly of the same date wherever they are found although sometimes near the surface of the earth, or covered with Limestone rocks at various depths.



Mulatto Stone.

406

*Silex Analcimus.**Analcime.*

Class 2. Earths. Order 1. Homogeneous.

Gen. 4. Silex. Spec. 16. Analcime.

Spec. Char. Primitive form, the cube. Spec. Grav.
about 2. Electricity difficult to excite by
friction. Vitreous, Fusible per se into a
transparent glass.

Syn. Vesuvian or white Garnet. Kirw. v. 1. 285.

Wurfel zeolith. Emmerl. v. 1. 205.

La zeolithe cubique. Brock. v. 1. 304.

Analcime. Haüy, v. 3. 180.

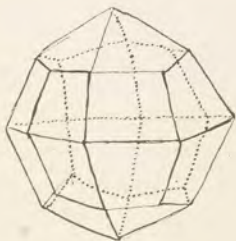
Vesuvian or white Garnet {The substance commonly called
Vesuvian should not be confounded with this, as it is a very
different substance which is called Adocrase by Haüy, &
574. and is commonly of a dark colour, but is probably
included under Mr. Kirwan's 18-, 36-, and 56-sided
crystals of Vesuvian Garnet.} is the only substance
mentioned in Kirwan that at all agrees with

this species: {Including only his 24-sided crystals}
 but in this as in many other substances described
 by that great author, he does not observe whether
 he ever saw any thing like it found in Great
 Britain. The specimen here figured came
 from Hirkleton, 8. miles west of Edinburgh, and
 seems always to present the same crystallisation
 more or less compressed. The crystals vary in
 transparency from transparent to nearly opaque
 white, and are often of a pale red, sometimes
 of a dull salmon colour. Sowerby has some from
 Catton Hill near Edin^{gh}. The fracture is often
 very conchoid, and somewhat like quartz, after
 being dropt red hot into water. Sowerby found
 one with a proper cubic fracture among many
 specimens, which leaves no room to doubt that
 the crystals here figured belong to the cubic variety
 of Brochant. The Dumbarton crystals are also

The same species.

The rock however in which they are found differ, as well as the manner of their immersion. Those figured are in gran-
 -ite { Hornblende and felspar } of Werner, (see Krivan 1. 353.) and situated in hollow cracks or
 fissures. Those of tab. 200. are lying in hollows or moulds, and are apparently the residuum of the substance which previously filled the place
 -space. Kriv. speaks of Vesuvian Garnets from the size of a pine head, to that of an inch.
 We have some which differ in appearance only in a darker hue, the gangue often partly stick-
 -ing about them, which is of a muddy brown. The mould or holes they were in are some smooth
 and some rough. This is the amygdaline of Lamy, and might be confounded with the analcime: but the latter can be fused by the blow-pipe; and if of the transparent kind,

it at first becomes opaque: if the heat be continued it becomes transparent, and at length fuses. The opaque spots become transparent & then fuse. M^r. Kinn. says the Vesuvian garnets fuse & fuse: but our Vesuvian garnets appear to agree with what Haüy says of his amphigene (viz.) that it is infusible, although the analume may be fused: both sorts are said to be found at Vesuvius. The hyalite, zeolite, and analume of these 3 plates seem nearly allied, { as they are all fusible per se by the blowpipe, and agree somewhat in this particular with the Scotch phospho-zeolite of which the analysis is given by M^r. Kennedy in the Phil. Mag.; it is desirable for that gentleman to examine the difference, and inform the world with that result. } and by some are thought to be varieties of each other. We hope analysis will soon clear up the point. Haüy takes his name from the weak degree of electricity this mineral receives by being rubbed; and we have found it just capable of holding a hair for a short time.



Cubic Zeolite, or Anatase, Scotland.

412

Ferrum oxygenizatum, var. radiatum.

Radiated Oxide of Iron, or Hematite.

Class 3. Metals.

Order 1. Homogeneous.

Gen. 7. Iron.

Spec. 3. Oxide.

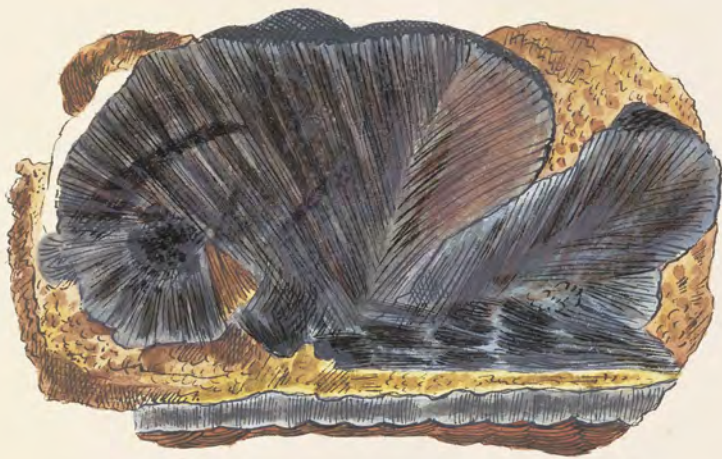
Div. 2. Imitative. Var. radiated.

Syn. Brown Hematites. Ann. v. 2. 163.

Brauner Glas-kopf. Emmerl. v. 2. 323.

Fer oxide Hematite. Haüy v. 4. 105.

This variety of Hematite Iron ore, comes from near Idku[?] and has not long been discovered. It has much the appearance of crude iron, with nearly the same shining facets in the direction of the radii, but blanches & duller in the opposite direction. These radii sometimes terminate like brownies in the matrix, which is a brown slag. It is not magnetic. Some of the variety fig. in tab. 62. is occasionally found about it. The ends are sometimes terminated beyond the matrix, like the ends of a bunch of wires, or obscurely crystallized with the ends approaching those of tab. 162 and 163. Ann. says, "seldom steel grey." External lustre 2, 3. Internal 2, 1. Spec. Grav. from 3.789 to 3.951. Streak reddish, or yellowish brown. In ours the powder the same colour as the streak "not magnetic till calcined, blackens before the blowpipe, gives Borax a yellow tinge with some effervescence." We do not know it has been analysed.



Hematitic Iron Ore from Salisbury Craig, near
Edinburgh;

416



*Bitumen resiniferum.**Resinous Bitumen.*

Class 1. Combustibles. Order 3. Mineral.

Gen. 1. Bitumen.

Syn. *Bitumensphattum*. Hatchett in Phil. Trans. for 1804. 410.

This very inflammable substance would, by its usual appearance, be taken for dark timber while wet, and for common clay when dry; consequently there is nothing in its common appearance that would indicate its inflammability or resinous quality. Very nice discrimination is therefore requisite to comprehend it. To the touch however it in some measure indicates a resinous quality.

Mr. Hatchett who first mentioned it in Lin. Trans. v. 4. 139, observes that "a yellowish brown compact substance, which in colour and fracture somewhat resembles ferruginous clay, is found occasionally with the Bovey Coal. It is brittle and highly inflammable; it melts like Bitumen, and emits a smoke which in smell resembles Amber. This substance is but rarely found". He also observes in Phil. Trans. 1804. 402. that "it is found in pieces of a moderate size."

The fracture is imperfectly conchoidal. It appears earthy externally; but when broken exhibits, in a slight degree, a vitreous luster. The fragments are irregularly angular, and completely opaque at the edges. It is extremely brittle. It does not apparently become softened when held some time in the hand, but emits a faint resinous odour. The specific gravity at a temperature of 60° of Fahrenheit is 1.135. When placed on a heated iron it immediately melts, smokes much, burns with a bright flame, and yields a very fragrant odour, like some of the sweet scented resins, but which at last becomes tainted with that of asphaltum. The melted mass when cold is black, very brittle, & breaks with a glassy fracture." By the analysis of 100 grains by W. H. Harkness it appears to contain:

Resin	55
Asphaltum	41
Earthy residuum . . .	3
	<hr/>
	99

This with a valuable series of the wood passing to the most perfect Bovey coal, came from Bovey Heathfield near Chudleigh, Devonshire.



Resinous Bitumens.

420

421

When Sowerby first visited the Isle of Dogs, he thought it would be interesting to observe and collect the strata as belonging to a certain level pretty well determined by its vicinity to the Thames. It was both beautiful & interesting to observe the Sulphur forming on the old stumps of trees that were found from 9 to 15 feet below the common level of the place; and perhaps it is no less remarkable that a stratum of leaves, which was in the same places 3 or more feet thick had a strong smell of Sulphur; but the Sulphur in general formed sulphate of lime or Gypsum, with the little Lime among it, sparkling in the sun like minute Diamonds. The same occurred sometimes upon the stumps of trees; but in some parts the Sulphur was nearly pure, brighter than that from Almarsh, covering the wood completely; in other places it seemed to be passing with the moisture out of the cracks, and followed the longitudinal direction of the fibres, prettily contrasting with the sparkling Gypsum. The golden hue, equalled the beautiful yellow Lichens on stumps of trees. We believe it occurs in some places in the inside of growing trees.



Native Sulphur, or Brimstone.

Surturbrand.

This is found near the mouth of the Ouse, ten miles from Brighton, Sussex; and is of the same kind as the Surturbrand of Iceland. Near the surface of the ground its changes are somewhat different from those of the foregoing, as it is less resinous-bituminous, and more oxy-carbonized. It is found in large masses resembling compressedumps of wood, and is of a most perfect black like jet; but if compared with good jet, has rather a gray cast. Sir J. Banks gave Sowerby a piece near two feet long, and above one in the broadest diameter; the compressed diameter is about two inches. The transverse section shows the concentric formation of the wood, and the sides crack or flake off more or less in circles. It is more brittle than jet, and being less bituminous, is not rendered electric by friction. It is often so much impregnated by white Pyrites that it is apt to fall to pieces with

the change of the atmosphere, even when preserved in cabinets.

Mr. Fabbell observes of Surtarbrand, Linn, Trans. v. 4. 399, "that it is rather harder than Bovey Coal, but in every other respect the same." Sowerby says it is generally blather, and appears to have been less disturbed, being more regularly formed, and the transverse fracture more polished, while that of the Bovey coal has rather a resinous appearance.

Sowerby has a Specimen, found near Belfast, on the side of a Mountain, the stratum being three feet thick, which comes immediately between the two ("If we stand upon close ^{distinction} ~~suspicion~~") not being so soft as Bovey coal, nor having such a polish as Surtarbrand.



Surturbrand.

429

430

431

3 ferrum oxygenizatum; Vir. stalactiticum.
Stalactitical Oxide of Iron.

Class 3. Metals. Order 1. Homogeneous.
 Gen. 8. Iron. Spec. 3. Oxide of.
 Div. 2. Imitative.

This specimen of Stalactitical hematitic Oxide of Iron is remarkable for being so closely surrounded with Rock Crystals, in a very curious situation. It is apparent that the Iron has been precipitated in a very moist state, and was not likely to penetrate the Rock Crystal; which therefore has surrounded the Iron, and must evidently have been formed at the same time with the Iron, or afterwards; but this latter is certainly most probable.

This is the blackest state of Hematites, with the radiating fracture, its common character.

This specimen is from Cornwall, the rocks of which County are generally supposed to be of primitive formation.



*Stalactitical Oxide of Iron, or Iron Hematites
in Quartz.*

435

Siliceo Granatus.

White Garnet

Class 2. Earths. Ord. 1. Homogeneous.
 Gen. 4. Siliceo. Spec. Granatus.
 Div. 1. Crystallized.

Boerhaave thinks this has never been before mentioned. Its
 size is small hardly visible with the lens. By them we
 can discern the modification common to Garnet, viz. the
 rhomboidal dodecahedron. The trial of the species was strength-
 ened by the blow pipe, under which it resembles the com-
 mon Garnet, tab. 69. and 99. These are found in irregular
 parcels, each crystal from the size of a small pin's head
 to extreme minuteness, sometimes clear and bright at others
 of a yellowish and dirty hue. They have generally well
 defined sharp facets, seem to vary little. They run in lines
 at the intervals of the divisions in the matrix, which at
 times is noted by the various appearance of its yellowish,
 greenish, light and dark reddish, & brown colours. These
 Garnets are sometimes mixed among a rough mass
 of nearly their own nature, which seems to incorporate
 with some Quartz. In fusion by the blow pipe they
 run into a black enamel without addition. The Matrix
 is chiefly Carbonate of Lime, and a siliceous substance
 resembling dull reddish Jasper.



Crystallized Garnets of a whitish colour.

438

439

Silex Quartzum.

Rock Crystal.

Class 2. Earths.

Order 1. Homogeneous.

Gen. 4. Silex.

Spec. 1. Quartzum.

Div. 1. Crystallized.

Rock crystals have been distinguished by many Mineralogists from the manner in which the crystals, depending on the column, swell or thicken in the middle. Rock crystals alone are so formed, but not all of them in this manner, as the Linnæan System tab. 73. has testified them from Quartz { Quartz in fire become opaque } rubbed together are phosphorescent, and exhale a peculiar emphyreumatic odour. All stones as hard as flint, so the consolidated aerial Diamond, does this with little difference. Rock crystal is often accompanied with Chloite so green it resembles soap, & has been taken for it: In this specimen parts are impregnated with it, and seem decomposing: the whole has something of an opaque whitish cast rather peculiar to this sort of crystal. They often have the substance called Lac-Lama about them.



Rock Crystal and Chlorite. Cornwall.

442

443

444

Macle or Chiastolite.

Class 2. Earths.

Order 1. Homogeneous.

Syn. Macle Basaltique, &c. Del' Isle, 2. 440.

Macles. Daubenton, 16.

Chiastolith. Karstein, 28.

Macle, Haüy, 3. 267.

A black slate holding in it great numbers of
 spindles of an *Echinus spatagus*. } Some scapulae
 petrified in Macle in its section resembles this: the inside
 part is round, & the four corners more or less rounded.
 Found in Norfolk; Woodward's Catalogue of Fossils, t.
 2. 55.

This specimen came from Shidlaw in Cumberland,
 said also to have been found in some parts of Scotland.
 It is mentioned by few Mineralogists. The same sort,
 in a similar gangue, has been brought to England
 from Bayreuth, & another sort has been imported
 from Lisbon, without a gangue, and much larger than
 these. They are religiously esteemed on account of the
 resemblance of the black part to a cross, and are sold
 by the monks as of great use to the peepers, gene-
 rally somewhat mutilated to humour the appearance.

of the crops, & to fit them for wearing, as preservatives from all evils. Mr. Thompsons has a specimen of this last sort about $\frac{3}{4}$ of an inch broad at top, and nearly resembling ours.

It is crystallised in slightly rhomboidal four-sided prisms of about 85° and 95° according to De la Rive. The laminae seem parallel to the faces of the column, & there appears by the construction and meeting of the laminae that there may be a diagonal division. Structure fine, earthy approaching to spinitery. According to Haüy, it appears that the integrant molecule is the tetraëdron.

Sowerby has a fossil very nearly resembling this, with an almost entire black centre, & nearly a whiter pearly covering. The black is generally supposed to be like the shale or substance of the crystals in closure. so that the whiter part is chiefly spinitery. It is curious they are so governed by a peculiar modification as to conjoin in such a manner as to envelope each other, yet retaining the rhomboidal form. Spec. Grav. 2.9444. As we have seen no analysis we could not determine its systematic name or place; but we hope to attain more knowledge of it at some future period.



Chlathrolite. Mount Shiddaw.

Carbo oxygenizans.

Oxide of Carbon, or Coal.

Class 1. Combustibles.

Order 1. Homogeneous.

Gen. 7. Carbon.

Spec. 3. Oxide.

Somerly has Coal, or what is commonly called Cinder, found near the Dyke, which crosses Lockfield Hill, called White Stone or Blue Stone Dyke, & other Coal mines in the North. { When must not here be confounded with small grained Granite: It is rather a gray basalt including feldspar. This Dyke is of a great extent. } When the Coal in these mines is examined we find it is the more ^{Cinder the more it is to the Whinstone. The figure will show the} like Coal, or ^{the} ~~the~~ like fractions on the Coal at the upper part, which is the appearance it had when first received, and like artificial Coal, in forming a horizontal columnar appearance, with cracks and burning without flame, &c. When examined with a lens the perforations appear to differ from artificial Coal in being more smooth & shining. The other part

of the Coal was not unlike common Coal at first appearance; but on examination with a lens, it showed little globules of Pyrites fitting to, and, filling the hollows, and giving an idea that by their passing out the coal would be rendered all ~~like~~ ^{like} the upper part. It was ~~then~~ ^{when} some time in a croud till the Pyrites had decomposed and the Sulphur was passing out as figured, but with a different effect to what it seemed to have had in its native place: instead of its leaving the coal in the form of lumps, it was falling to pieces with another sort of fracture & tendency to crumble to dust. The lower figure shows a fragment partly columnar, with the empty holes; The left hand end shows the Pyrites in the upper holes and the Sulphur below, corresponding with the figure of the little upper particle of Iron Pyrites, & the Sulphur dust underneath. The Coal further from the Whin has fewer, but often larger holes in it, & it sometimes has only a few. At the distance of a few feet the Coal is free from hollows, & burns like the best Newcastle Coal.



Oxide of Carbon, or Coak.

452

Ferrum oxygenatum; Var. stalactitium.
Stalactitical Oxide of Iron.

Class 3. Metals.

Ord. 1. Homogeneous.

Gen. 8. Iron.

Spec. 3. Oxide of.

This is another remarkable stalactitical production from Mam-Tor Derbyshire, it was taken for mineral pitch, which it resembles. It is found to be an Oxide of Iron. Its situation is nearly as remarkable, when carefully examined, as that mentioned in another place; for its being so distinctly formed above the calcareous stalactite, gives an idea of its being a lighter substance. This might appear impossible: Nature, however is seldom at variance with herself and by a steady observation we may reconcile these apparent difficulties. It might happen that water very readily took up the oxide of Iron which it found in its passage through the matrix, and, by dropping into some hollow, formed a stalactite, often coated by that which follows, and which was not so soon displaced.

or as soon fitted for Incipitation. Some of the coats are in such a state that they resemble Martial Ethiops.

It comes near to the appearance of Hematites; it however has not the striated character, but rather the conchoidal fracture of pitch. A little heat renders it magnetic, but does not take much of the blackness off. perhaps it contains a little Manganese, as the ochraceous part becomes somewhat crimson with heat.

A small degree of heat, would melt it if it were pitch. This is a sort of crystallized Stalactite as the calcareous part may be the Calx sinter of Werner, the fracture is more or less distinct in this specimen, as well internally as externally. It seems to have been formed after the iron, by nearly the same process but was retained longer by the water.

The ochraceous part at first sight resembles a panicle of leaves from a chalybeate spring, and is of a deep orange colour.

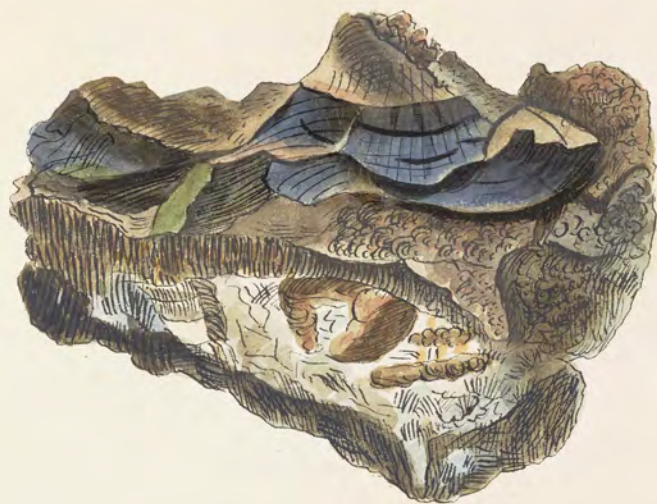


*Stalactitical Oxide of Iron, coated by
Carbonate of Lime.*

456

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This is remarkable for its conchoidal fracture, on the face of which, when minutely examined, peculiar wings occur, bounded by curved lines crossing each other, & terminating in a kind of centre not remarkably resembling the fracture of Carbonate of Lime with a kind of arborescent crystallization; { I have lately received a fine specimen of Carbonate of Lime from Achenbach, very expressive of this. } The cracks seem not at all guided by this. It soon separates if stretched out. It is externally of a blooming gray, & internally of an olive green colour. This is owing more or less from different parts of the gangue, which is a mixture of Carbonate of Lime, Galena, &c. Some of the smaller particles have a reddish tincture in their flaws.



Soft elastic Bitumen harder than tab.¹⁰⁴ and much in
the state of India Rubber.



[Faint, illegible handwriting at the bottom of the page, possibly a signature or a note.]

Tab. 214.

Ferrum Cupreo-arseniatum.

Cupreous Arseniate of Iron.

Clas. 3. Metals.

Ord. 1. Homogeneous.

Gen. 7. Iron.

Spec. Arseniate.

Var. Cupreous.

Spec. Char. Iron, Copper, and Arsenic Acid in combination.

Syn. Cupreous Arseniate of Iron. Bournon an Chem. Soc. Phil. Trans. for 1804

This substance, which is rare in Cornwall, has been brought from Siberia by Professor Pallas, found in the Muthel mine along with the cubic Arseniate of Iron. The crystals are always small, generally clustered, more or less in bundles or confused. The individuals form rhomboidal prisms having the two opposite angles very obtuse; consequently the two others are very acute, terminating with four scalene triangular faces, fixed lower on the acute angles than on the obtuse ones. We cannot be certain that the angle bearing upon the obtuse side of the pyramid is not a right angle: see the Geometrical figure.

The upper specimen is a largish collection of clusters variously grouped diverging from a centre with the faces of the pyramid only exposed. It is in an irregular gangue of white Quartz with some blackish lumps of gray Sulphuret of Copper, and a few rectangular plates, perhaps Uranite. The left hand bottom figure represents a specimen with more distinct crystals looking like Spindles, scattered in the hollows of an ochraceous gangue. These sometimes expose one, and at others both ends: see the lower figure. These crystals are mostly of a light shining sage green.

Analysis by Chenevix:

Silica	0.3
Arsenic Acid	33.5
Oxide of Iron	27.5
Oxide of Copper	22.5
Water	12



Cupreous Arseniate of Iron.

464



Ex libris

465

466

Tab. 215.

In examining the Bitumens, it is difficult to say whether they pass from Naphta & Petroleum to Pitch and Asphaltum, by a regular gradation, through the elastic kind, or not, as they seem to pass naturally from one to another without them. By accidentally breaking a mass of crystallized Carbide of Lime, was found in a hollow a black mineral pitch, in a liquid state: see the left hand bottom figure. This has now become condensed and elastic, but not so much so as the substance in figure. The outer surface is brownish, with more elasticity, and may be separated by the nail like the middle figure, which shows the outside and inside. The left hand fig. shows also hollows in the centre of the outer crust, something like the mouth of a minute crater; giving a strong idea of its having been once in a state of powerful ebullition from that hole. This is a darker coloured Bitumen, possessed of greater elasticity than any that has been before mentioned, among specimens. This should be placed as the darkest & perhaps nearly the last of the elastic sorts.

tab 115. is a more undurated Bitumen, which seems to have been in a state of ebullition, from the circular indentures remaining on the bubbles: see the right hand figures at the bottom. They are very neatly formed upon whitish cubic Shivers, and seem as if they had splashed about in falling. Whatever is the cause the effect may be gained by a stronger heat; as the nearer these substances approach combustion, the more they harden, and form the appearance of Asphaltum, which we suspect this substance to be. This is from the same place the other came from, and is black all through. Fractures conchoidal & shining, destitute of any lighter illuminations, being perfectly opaque.



*Soft elastic bitumen, more indurated, approaching
Asphaltum.*

170



Handwritten text at the bottom of the page, likely a signature or title, written in a cursive script.

171

Tab. 216.

This is nearly of the same formation as Tab. 107. The crystallization radiating from various centres with the terminations meeting { The Radii in W. Hall's specimen mentioned Tab. 107. are a foot long. The sides of which are divided by a double direction of curved lines crossing to a central bar, consequently circumscribing rhombic forms with two convex and two concave sides. } They however are in more determined columns of three sides, and the pyramids at first sight appear more simple: however, there is a tendency to double each face of the pyramid, making, like the metastatique, a 6-sided pyramid. This is one of the darkest coloured ones of this nature.



*Sugar-candied, like Carbonate of Lime, with a
peculiar Crystallization, darker than
the last.*

There is a great deal of
writing in this book, and
it is very interesting.

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